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# Dementia Praecox Studies

## A Journal of Psychiatry of Adolescence

Published Quarterly

BAYARD HOLMES, Editor

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Vol. I, 1918

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SOCIETY FOR THE PROMOTION OF THE STUDY OF DEMENTIA PRAECOX  
30 NORTH MICHIGAN AVENUE  
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# PROSPECTUS *of* **Dementia Praecox Studies**

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With the advancement of scientific knowledge, the need of specialization arises. Coincident with the growth of special departments of knowledge there arises the further need of a medium of expression. Thus, there have developed the great fields of science—Astronomy, Mathematics, Physics, Chemistry, Zoölogy, Botany and Geology—each one the outcome of men's interest and each one expressing itself and centralizing interest in its own particular field by publications. Of the many important functions of the journals, there is none more pre-eminent than the knitting together of a group interest, which promotes and stimulates co-ordinated attack upon scientific problems. The history of science abounds in examples of this influence. The Philosophical Magazine has been the forum of English scientists for generations. Pflüger's Archiv has been as important for the development of Physiology as the Cymograph. The Annalen der Physik epitomizes German research in Physics. Thus knowledge grows from more to more.

In psychopathic medicine which, until recent years, has had no special procedure of its own, advance has come only indirectly by reflection from other related fields. Surgery, neurology, physiology, bacteriology and psychology have each contributed something to the knowledge of mental disease. Important as these gifts are, no department of medicine can justify its right to exist unless it attempts to solve its own problems. At the present time two radically different conceptions of the mode of origin of mental diseases are held by students of these disturbances. By one group of authors the attempt is made to interpret all psychopathic behavior from the standpoint of subconscious complexes. The psychogenic hypothesis has been developed with great vigor and ingenuity and in response to the need for a medium for the expression of this interest several journals have been published. There exists on the other hand, a group of scientists who hold to the hypothesis

DEMENTIA PRAECOX STUDIES

that disease of the mind is a result of organic disease of the body. The editors of this journal hold to this faith. They feel further that many considerations urge the publication of a journal devoted exclusively to the study from the organic point of view, of one part of the field of mental disease, viz., dementia praecox.

Although the name dementia praecox is an unfortunate one, it is, nevertheless, the appellation of a well recognized and clinically well characterized group presenting definite social, economic, legal, medical and pathologic problems of monstrous proportions. The largest single group of dependent and delinquent citizens thrust out of self-supporting society by disease and committed to the custody of the State is the dementia praecox group. A census of one of the largest institutions in Illinois in 1917 showed that sixty per cent of the inmates were classed after months of observation as dementia praecox patients. The average number of admissions to a large receiving hospital the same year was 3,000, and twenty per cent of them were committed with the diagnosis dementia praecox. There are 220,000 patients in the 400 institutions for the insane in the United States. If sixty per cent of them are patients with dementia praecox, then 130,000 of them are suffering of a disease of unknown etiology, unknown pathology for which there is no effective remedy and, worse than all, no adequate efforts at study or research. It has been shown by La Moure that patients with this disease live in the State Hospitals of New York an average of fifteen years and cost the State \$200 a year, or \$3,000 each. The 130,000 dementia praecox patients in the hospitals of the United States will cost the country \$390,000,000 in the aggregate, and certainly no less than \$26,000,000 per year, and there is nothing to stop it.

In spite of the magnitude of this problem there is a great scarcity of books and monographs dealing with the physical, chemical and biological conditions of the unfortunate victims of this disease. There has not been published in the English or any other language during the past five years a book of 200 pages on Dementia Praecox, nor has there ever appeared in any part of the world a journal or magazine devoted to this condition.

In order to stimulate further research and to co-ordinate work already in progress in different parts of the world, it seemed desirable to organize

*PROSPECTUS*

a society for the study of dementia praecox, the chief function of which should be the establishment of a means of communication between its members. On July 13, 1917, in the city of Chicago, the Society for the Study of Dementia Praecox was organized. Dr. H. C. Stevens was elected president; Dr. George Michell, vice-president, and Dr. Bayard Holmes, secretary and treasurer. Since it devolves upon this society to establish a journal to collect and disseminate information relative to this disease, the officers have resolved, therefore, to take the profession into their confidence and ask support.

It will cost \$600 to print and mail four numbers of 34 pages each, and another \$600 for the clerical work of publication and circularization to secure 250 subscribers at \$5 each. Therefore, 250 paid subscribers must be insured and the money in hand before a single number can be published. The interested readers are naturally few. There are about 400 institutions in the United States for the care of the insane. The larger number of them are public hospitals unable to subscribe without such an amount of red tape as to make their patronage of little value for our immediate venture. The 3,000 medical officers in the service of the insane are said by medical booksellers and publishers to be liberal buyers. The trade in psychiatric literature is immense. Psychiatric journals, however, are few. We may reasonably expect by careful and persistent correspondence to secure one in ten of the psychiatric physicians of the country. We propose a journal of the first class, containing nothing but original matter, bibliography, and abstracts of current literature on dementia praecox. The form of the journal will be the same as this circular. It will be set up in ten point strictly classic type, and printed on paper capable of taking half-tone engravings. There will be sixty-four reading pages in each number. Some portions of the cover may be used for advertisements, but a periodical of such limited circulation attracts few advertisers.

During the past four years Dr. Bayard Holmes has sent out reprints of his articles under the heading **Dementia Praecox Studies**. His mailing lists will be used for this circular and the characters of those reprints guarantee the purpose of this journal. Not a contract will be made and not a check received for subscription will be cashed until \$1,000 for paid subscriptions are in hand. The work of the Research Laboratory

*DEMENTIA PRAECOX STUDIES*

of the Psychopathic Hospital, Cook County Hospital, will be published in this journal.

Please, therefore, execute the following:

(Postal address).....State.....

Dr. Bayard Holmes, Sec. and Treas.  
30 North Michigan Ave.,  
Chicago, Illinois.

Enclosed herewith is my check for **Five Dollars**, subscription for **Dementia Praecox Studies**, a journal of psychiatry of adolescence to begin publication on January 1, 1918, with Bayard Holmes, M. D.\* as editor and issued quarterly from Chicago. This subscription makes the subscriber eligible to election to membership in the Society for the Study of Dementia Praecox and will be accepted for the annual dues of the society for the succeeding year.

Signed.....

Address.....

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\*The imminent likelihood that Dr. Herman Campbell Stevens will soon be called to service abroad makes this change in editorship necessary.

# Dementia Praecox Studies

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VOL. I.

JANUARY 1, 1918

No. 1

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## OUR POINT OF VIEW.

The purpose of this publication is to arouse interest in the subject of dementia praecox. While to many it may seem an unwarranted undertaking, to single out from the whole field of the insanities a group which future investigation may resolve into several pathological entities, there is much to be said in justification of our position. It may be urged first that for sentimental reasons the spectacle of some twenty thousand youths—the equivalent of one division of our army committed each year to the State Hospitals for the insane demands something more than casual commiseration. No stratum of society is left untouched by this disease. It claims its victims impartially from the homes of the well-to-do and the poor; from the families of the intellectual, professional classes, and from those less liberally endowed. The truth of this statement is amply demonstrated by the motley character of the witnesses who congregate in the court of the official charged with the legal commitment of the insane. On court days one may see the dirty and ragged relatives of one adolescent patient sitting side by side with the prosperous parents of another. No station in life is immune to its ravages. The numerous "nervous break downs," the unexplained suicides of the young, some of the mysterious disappearances of young men and women from their homes, and the adoption of an unmotivated career of crime are instances of the havoc wrought by this disease. If one were moved by pity alone the sight of this silent army of insane adolescents filing yearly into the hospitals of the State, above the portals of which are written the words of Dante "abandon hope ye that enter here," should compel some efforts to ameliorate or cure.

The money value of this human wastage is enormous since it operates in two directions. Not only are twenty thousand youths removed annually from productive service in society as effectually as they would be if they died outright; but, worse than death, they are condemned to a custodial life for an average period of fifteen years at an annual cost to the State of two hundred dollars each, thus making the total average cost for the care of each case of this disease, three thousand dollars. When this figure is multiplied by 130,000—the estimated number of dementia praecox patients in the hospitals for the insane in the United States—one reaches the enormous total of \$390,000,000 for each period of fifteen years or \$26,000,000

annually. Surely, an economic problem of this magnitude demands some attention. Nor is this all. No inconsiderable part of juvenile crime is caused by dementia praecox. In one thousand cases of adolescent delinquents examined by Healy in the Juvenile Psychopathic Institute of Chicago, (Detention Home) were classified by him as dementia praecox. According to Judge Olson of the Municipal Court of Chicago, a very large per cent of the delinquents prosecuted in the Boy's Court are cases of dementia praecox.

The medical problems presented by this disease can be solved in spite of the complexity and the intrinsic difficulty of investigating mental maladies. The scientific attack on the problems of dementia praecox require the co-operation of three fields of investigation, with the understanding that each field be represented by many workers. These three fields, named without attempting to assign their relative importance, for, where each part is essential to a whole there can be no question of subordination or superordination, are Morphology, Biochemistry, and Psychology. These three departments of knowledge investigate the three fundamental aspects of living things, viz., *structure*, *function*, and *behavior*. It goes without saying that this view of things also includes those mal-formations, dysfunctions and mal-adjustments which constitute all of the manifestations of disease whether of the body or of the mind. Indeed, if one holds fast to the organic view of living things, it becomes apparent that there can be no marked deviation from the normal in any one of these departments without producing a corresponding departure in the others. *Structure* and *function* and *behavior* interact upon one another and influence each other reciprocally. Such a large conception is needed to comprehend the diverse symptomatology of dementia praecox. The clinical picture includes so many types that only a very comprehensive concept is adequate to it.

The actual attack on the problem must be made by painstaking piecemeal, studies of many, minor problems, often seemingly unrelated to one another. Science grows by the concretion of small parts. In the study of dementia praecox no new methods are required. We need only to bring to bear upon it those instruments of research which have been used with success in the solution of other problems. How little is known about the disease is apparent from a reading of the standard treatises on psychiatry and from the current literature. It is the purpose of this journal to serve as a clearing-house for scientifically established facts—with regard to dementia praecox. Any competent and conscientious study of a morphological, biochemical, or psychiatric nature will be accepted. It is the aim of the editors to encourage research in the hope that a rational therapy and prophylaxis may result. Already substantial progress has been made in the study of this disease by the Research Laboratory of the Psychopathic Hospital of Cook County, Chicago, an account of which will be found in another part of this issue. It has been shown that the intra-spinal pressure in a preponderating

per cent of the patients examined in the Psychopathic Laboratory, is increased from one-half to twice the normal amount. In many cases examined, the spinal fluid shows an increase in globulin or a substance precipitated by ammonium sulphate. The Roentgenologic examination of the intestinal contents shows in nearly every case marked cecal retardation. This finding has led to a study of the bacterial flora of the cecum (the material for which was obtained through a cecal fistula and from the stools) in the hope of discovering an organism which may produce toxic substances from the split products of protein metabolism. The application of psychometric methods to the dementia præcox mind has shown that there are three significant weaknesses, viz., in resistance to suggestion, constructiveness, and reasoning. These fragmentary results and others that might be cited only prove how much remains to be done before we have gained an insight into the nature of the disease to which this journal is devoted. We have made this start in the hope that other workers both at home and abroad may be encouraged to undertake investigations in this field.

The social and economic bearings of this subject are so important that we have felt the need of co-operation and support. The scientific workers need the help of laymen, State Officials, County Judges, and the Charity Organizations which deal with mental disease. In order to bring together these various constituencies and to enable them to exert their force in a common cause, a society for the Study of Dementia Præcox has been organized for the promotion of knowledge about the disease and to improve the condition of the patients who suffer from it. Already much excellent work has been done by teachers of handicrafts in the State Hospitals and in the occupational centers maintained by the Society of Mental Hygiene. Not only is the economic production of these idle hands worth considering, but the therapeutic value of a constructive occupation is most excellent. It is very desirable that all persons interested in dementia præcox unite in furthering the aims of this society. Only by the concerted, united effort of a large group of persons representing the scientific, custodial, and social aspects of this disease, can progress be made towards amelioration and cure.

H. C. STEVENS.

## THE APOLOGY TO THE READER.

It is becoming one who launches a new periodical to make some explanation to the public for the presumptuous effrontery. This unpleasant duty falls upon the emergency editor, who will meet the obligation in a categorical and inelegant, though perhaps not ungracious manner.

1. There are now in our four hundred hospitals for the insane not less than 130,000 inmates who are in a more or less deteriorated and demented condition and are generally referred to by the psychiatric force in whose custody they are legally placed as dementia *præcox* patients. Reinforcements are coming into this army of defectives at the rate of fifteen thousand or more a year. On their commitment papers they are also given the same diagnostic appellation. It is freely admitted by all that this is a clinical term with no pathologic and scant etiologic foundation. In different hospitals and by different men the boundaries or limitations of the term are variously stated or the general term is modified by guarding and protecting adjectives. Therefore, to avoid time consuming argument, we use the unwelcome term without further attempt at definition and without suggesting a less barbarous explicative.

2. No other diseased condition stands so much apart from the pathologic entities which have already been explained by research of a clinical or experimental nature or have submitted to preventive or therapeutic control, as the subject of these studies. It is on account of this isolation that all the scattered observations which might perhaps lead to the solution of the etiologic, the pathologic, and the therapeutic problems of the disease have failed to arouse interest and investigation by promising analogy. This isolation, then, calls for a concentration in the media of intellectual and emotional exchange. There are numerous Journals of Tuberculosis and there are several avenues of publication confined almost entirely or entirely to syphilis, although articles on both these subjects are welcome in general medical journals.

3. In this periodical the physical or mechanistic attitude of science, which has resulted in the solution of many if not all the problems of such clinical entities as scurvy, beri beri, the big lazy, yellow fever, small pox, malaria, syphilis, typhoid fever, diphtheria, erysipilis, hospital gangrene, cholera, and the itch, is presumed to be of universal application. The great need of speedy help for the fifteen thousand youths marching into our institutions for the insane imperatively calls for research rather than argument.

4. The fact that we are in the midst of a great war should not slack our efforts to prevent the drain upon our second and third decades by this disease. On the contrary it should accelerate those efforts. From the same decades of life our army in France and our wrecks in the State Hospitals for the insane are drafted. We who stay at home, willy nilly, must not

neglect the obvious duties of home or state because we must meet the imperative obligations of our army abroad. In the stress of the Cuban war, the dangers of yellow fever were forever eliminated from the progress of civilization by scientific research. During the war between Russia and Japan great progress was made toward the subjugation of typhoid, dysentery, and beri beri. Again it is a weak sort of patriotism that displaces the obvious duties of domestic and social life for the assumed and ostentatious sacrifices demanded by our government for a righteous war.

5. It will be impossible to fill the pages of these *studies* with matter satisfactory to every reader. There are not enough men at work upon the dementia praecox problem to fill these pages with the reports of their researches. It is no doubt the desire of every student of this subject to see one after another of the redoubts of our ignorance of this disease fall as they must fall before activated research, until (1) *the diagnosis can be made by objective methods long before mental deterioration appears;* (2) *until the treatment whenever initiated is effective in restoring to relative integrity and health;* and (3) *until preventive measures are positive and reliable.* Our problems, however, are most intricate and the almost limitless frontier of our ignorance is beset by the morasses of prejudice, superstition, institutionalism, and mysticism. This problem does not yield readily to the nibbling methods of motiveless professional research. The patients are segregated and far removed from the facilities of research connected with our universities. There are no prizes, no rewards, no available funds advertised to encourage students and investigators to dig into this problem of setting free the great army of "youthful shut-ins." It has not yet dawned upon our Boards of Control, our Boards of Public Welfare and other officers of the State that the problem of a group of 130,000 pitiable wrecks with this disease now in custody and costing the State \$26,000,000 a year is worthy serious effort and proportionate expense at solution. It has not yet occurred to the opulent parents of any dementia praecox boy or girl that they should initiate research on this problem by offering prizes or paying subsidies for suitable adventure. The minor and inconclusive researches which we are able to present in these pages must be surrounded by an optimistic and encouraging propaganda and a well directed presentation of concomitant achievements and properties. It is, then, the motive of these *studies* to encourage research for prevention and cure.

6. The relation between the Society for the *Study of Dementia Praecox* and the *Studies*, has yet to be determined. It must be vital in order to be potent. The meeting in Chicago in June or July, 1918, should permanently fix the activities and responsibilities of each. The fact that only a small number of professional psychiatrists are interested in mechanistic researches on dementia praecox patients, naturally leads to the extension of our membership into non-professional groups who are brought in contact with the disease, and even to the encouragement of membership among that larger

class of "friends of dementia praecox patients." Some consideration must be given to these readers and articles which might otherwise be considered too rudimentary or too didactic for a special journal will be gladly included.

7. The country is well supplied with libraries but, to the beginner at least, utility of these libraries is much restricted by the lack of proper bibliographies. On that account somewhat extensive and accurate lists will be published for the assistance of research students, and the editor will assist research men who are far from large libraries with copies of articles and even with books when required.

8. In an adventure of this kind where so much is at stake, where up to the present time so little interest has been manifested by concerted activity, it is necessary to exhibit the greatest and most devoted comradery. Smother argument in action. The research man is above all things modest and acutely sensitive. He is no time-server, no place hunter, no salary grabber. Observations are delusive, interpretations are prejudiced. The seeker after cause and cure is the solitary, isolated, and often desperate medical scout; sometimes figuratively in the air, sometimes creeping and crawling through the jungles of no man's land, always surrounded by hostility and danger. Do not say him no. Let him go his own way and yourself out-do him in activity and devotion. Drive, push, but do not knock.

9. Should any one count this effort at research, at publicity, and at propaganda inadequate for its purpose, it will be readily conceded by us, but this effort is not in any way crowding out other, better undertakings. It is acknowledged as a forlorn and almost frantic undertaking to bring succor and relief to an annual draft on our American youth of more than fifteen regiments a year. Without subsidy and without assistance this determined and deliberate venture is launched and it will continue as long as we have mind and means to carry it on.

BAYARD HOLMES.

## THE PRESENT STATUS OF HISTOPATHOLOGY OF DEMENTIA PRÆCOX.

By G. B. HASSIN, M. D., CHICAGO, ILL.,  
Attending Neurologist Cook County Hospital.

Dementia praecox is generally looked upon as a structural, or organic disease of the brain, of that portion of it that is known as cortex. The latter consists of enormous amounts of ganglion cells, nerve fibres, neuroglia tissue and vessels. The ganglion cells are situated in the form of layers, each layer possessing a definite and typical histological structure. The number of cortical layers varies, according to the region of the cortex, three-fourths, i. e., 75 per cent, of which have, according to Brodmann (1) six layers. Some regions as the visual sphere, the calcarine portion, has more than six layers; while the motor area less. The first and sixth layers are found to be the most constant ones, the second and the fourth layers are the most variable, while the third and the fifth occupy the middle position. The nerve fibres, like the ganglion cells, also form typical structures, each ganglion cell layer corresponding to a definite grouping of the myelin fibres. Some of the latter run horizontally (tangential fibres), some vertically. The neuroglia tissue consisting of cell bodies and fibres is spread all over the central and peripheral nervous system. In the peripheral nerves it is represented by the well-known Schwann cells. The fibres of the neuroglia tissue are not independent formations as thought by Weigert, but are a part of the cell bodies which occur in the brain either in the form of astrocytes (Deiters' cells) or in the form of so-called glia nuclei. The latter show a very small amount of protoplasm, therefore, they are also known as "protoplasm poor" glia cells. They are normally scattered all over the cortical layers, and around each ganglion cell there usually can be seen one, rarely two, glia nuclei described by the German authors as "Trabant" cells, or satellites. Some authors as Obersteiner,<sup>2</sup> look upon them as lymphocytes. This view is decidedly wrong. Aside from ganglion cells, nerve fibres, neuroglia cells and glia fibres, there are in the cortex a great number of vessels and capillaries. Thus the cortex consists of elements that derive their origin partly from the ectodermal layer (ganglion cells, nerve fibres, neuroglia tissue), and partly from the mesoderm, to which belong the vessels and their contents (blood corpuscles). Changes in all these ectodermal and mesodermal elements have been looked for by the students of the histopathology of dementia praecox. The first student to describe the histopathological changes in this disease was Alzheimer,<sup>3</sup> who in 1897 made a brief report with demonstrations to the Congress of S. W. German Neurologists.

He pointed out marked structural changes in the ganglion cells with a tendency to their total disintegration, and this condition was combined with marked pathological glia proliferation. The changes were preferably

confined to the deeper layers. The nuclei of the ganglion cells appeared greatly swollen, the nuclear membrane folded, the cell bodies shrunken, and in older cases<sup>4</sup> the glia was greatly proliferated just like in general paresis. The pathological changes were thus exclusively limited to the ectodermal or neuro-epithelial elements of the French authors, a fact which was confirmed by all the subsequent, numerous investigations (Dunton,<sup>5</sup> Leroy and Laignel-Lavastine,<sup>6</sup> Klippel and Lhermitte,<sup>7</sup> Mondio,<sup>8</sup> Nissl,<sup>9</sup> Rosenthal<sup>10</sup> and others). Any involvement of the mesodermal elements, any inflammatory phenomena, any pia changes were usually found absent. The investigations of Alzheimer gave an impetus to further studies of the pathology of this disease, of its various forms, stages, etc., and the results are as follows: The ganglion cells, especially of the second and third layers, consisting of the pyramidal cells show structural and chemical changes. To the former belong various changes of the cell bodies described by Nissl as acute cell disease, chronic cell disease, cell shrinkage, etc. The Nissl bodies, also known as tigroid substance, are usually broken up, converted into small dust-like particles, a condition commonly known as chromatolysis. This may be total, covering the entire cell body, or central, confined to the region of the nucleus only (Dunton, Klippel and Lhermitte, Wada,<sup>11</sup> Mondio). The cell processes are mostly present, but stain poorly, may be fragmented and even totally absent (Mondio). The nucleus is mostly dislocated, *i. e.*, removed from the center of the cell body, is poor in chromatin, shows a folded membrane and is frequently atrophied. The nucleolus is, as a rule, excellently preserved. In older cases the cell body is greatly shrunken, vacuolated (Wada, Mondio), appears sclerotic, or shows numerous small evts. Some cells show ring-like light spaces around the nucleus, also described as "Wasserveränderungen" by the German authors (Rosenthal, Ranke). Rosenthal considers characteristic and most constant for dementia praecox a pathological condition of the ganglion cell which he described as "Cell Schwund" ("fading cell"). In this condition the nucleus of the ganglion cell appears larger than usual because of the disappearance of the perinuclear stainable substance; the nuclear membrane is thin, pale, stains poorly, the nuclear membrane contents are not well defined, and the nucleolus shows vacuoles. In some cases a condition was noticed (Southard and Canavan<sup>12</sup>) known as axonal degeneration. The cells appear swollen, rounded up, the Nissl bodies broken up, the processes are shortened, or totally wanting, the nucleus dislocated, etc. Of the numerous types of cell disease described by various authors the most constant ones are the acute cell disease, chronic cell disease and the "Cell Schwund." In some cases one type is present, in others another type, and in some there is a combination of several types present. The final outcome is a total disappearance of some ganglion cells, their gradual melting away which results in so-called cell loss. Much attention was also paid to the condition of the fibrils traversing the cell body and its processes (Wada, Schütz,<sup>13</sup> Marchand,<sup>14</sup>

Buck and Deroubaix,<sup>15</sup> Moriyasu,<sup>16</sup> Goldstein,<sup>17</sup> and others). They were found thickened, pasted together, and in older cases broken up into small particles, granules, etc. The extracellular fibrils were found to be more resistant than the intracellular ones. Wada thought it possible to explain the catatonic stupor by these fibrillary changes. As the fibrils, he says, form the conducting paths for mental processes the latter cannot be conducted normally, as the paths are destroyed and have to be conveyed by the cytoplasm itself.

Aside from purely structural changes mentioned above, a pathological ganglion cell may show its diseased state by the presence of products of abnormal metabolism, so-called split products, or "Abbau Stoffe." These products have been studied chiefly by Alzheimer and his school. The main split products are fat-like substances, known as lipoids, which give characteristic stains with sudan III, scarlet red, osmic acid, nil-blue sulphate and Alzheimer's light-green. Aside from the lipoids there are to be found in some cases so-called pre-lipoid substances in the form of various granula. The occurrence of fat-like substances in dementia praecox brains was noticed by the earliest students of this disease (Dunton, Klippel-Lhermitte, Wada), but was especially followed up by the school of Nissl-Alzheimer (Cotton,<sup>18</sup> Sioli,<sup>19</sup> Rosenthal, Ranke). Cotton studied twenty cases of dementia praecox and found all the cells of the cortex involved, especially in the frontal lobe in the second and third layers. The cells were loaded with fat, which was especially gathered at the base, between the nucleus and the periphery, also in the axone and caused misplacement of the nucleus. Aside from lipoid substances protagonoid granula and fibrinoid granula were described, the former by Sioli, the latter by Alzheimer.

In contrast with the ganglion cell changes which are so numerous and, in fact, striking, the changes in the nerve fibres are rather rare, almost exceptional. Kurt Goldstein speaks of loss of myelinated fibres in the cortex and occasional tumefaction of those that escaped. The majority of authors either do not mention any changes in the nerve fibres at all or report negative findings. The parenchymatous changes in dementia praecox brains are thus almost exclusively confined to the ganglion cells. They are, as a rule, accompanied by marked changes in the neuroglia tissue, which changes may be like those in the parenchyma regressive in character, but are frequently of a progressive nature. The progressive changes were found in those regions that showed the above mentioned "cell Schwund," while the regressive changes frequently appear as "so-called ameboid glia (Alzheimer, Eisath, Sioli) which was especially studied by Alzheimer and his school. The ameboid glia cells appear as homogeneous, more or less large cell bodies with numerous dull, short processes," or without any processes whatever, containing densely stained so-called pyknotic nucleus. They are frequently loaded with the catabolic products, the various granula mentioned above (fuchsinophile, methyl-blue, light-green, etc.). The progressive

changes in the glia may show as glia mitosis, increased size of the cell body, proliferation of the glia fibres, and of the glia nuclei. Glia nuclei proliferation is mentioned by the majority of authors and described in American-English literature as satellitosis. Under the latter is properly meant an increased amount of protoplasm poor glia cells around the ganglion cells, when the latter are diseased. Frequently a ganglion cell appears perfectly normal in size and form, yet it is surrounded by a large number of satellites, *i. e.*, shows the presence of satellitosis. It is quite suggestive to assume the presence of the latter as an indication of a diseased state of a ganglion cell even when histological changes cannot yet be demonstrated. Satellitosis was found in dementia praecox, though not so frequently and not so pronouncedly as in other psychoses (manic-depressive insanity, d. paralytica). Orton<sup>20</sup> found it especially marked in the deeper layers. When the ganglion cell is destroyed the satellites can be seen invading the latter, a condition commonly known as neuronophagia. Besides satellitosis, neuronophagia and ameboid transformation of the glia there is often observed proliferation of the glia fibres which often form small foci of gliosis or sclerosis (Morse,<sup>21</sup> Eisath,<sup>22</sup> Rosenthal, Ranke), though some authors as Wada are inclined to look upon the latter as the manifestations of senility. The glia proliferation was especially marked in places of marked cell destruction and Rosenthal distinctly states that there is a correlation between the intensity of the glia proliferation and ganglion cell changes. On the other hand, Southard<sup>23</sup> pointed out that cases do occur where the parenchymatous changes are "maximal," the interstitial being just the opposite. Of 232 loci (layers) examined he found cell loss 123 times, while in the same loci but seven instances of neuroglia proliferation was observed. The parenchymatous and interstitial lesions, says Southard, may be dissociated or combined, "much as similar lesions in the kidney." Neither were the parenchymatous changes equally pronounced in every case. Thus Wada found cell loss in the deeper layers but once in four cases, and by Canavan and Southard<sup>12</sup> cell loss was found but 55 times in 224 loci examined (20%); gliosis in the same patient was found but 19 times in the same 224 loci. In another case the cell loss was present in 43 per cent, gliosis in 11 per cent; in a third case gliosis in 3 per cent, white cell loss in 53 per cent. The distribution of the parenchymatous and interstitial changes is not equal in various portions of the brain, their topography varied greatly. Though all the authors studied the brain changes in dementia praecox topographically, *i. e.*, according to various areas, none of them has done it on a scale as has Southard.<sup>24</sup> The almost unanimous conclusion arrived at was that the entire nervous system is involved, even the cerebellum (Klippel and Lhermitte,<sup>25</sup> Claude,<sup>26</sup> and others), and the spinal cord (Klippel, Lhermitte, Moriyasu) where the Clarke's columns were especially affected, but that the frontal lobe was found involved more frequently than any portion of the cortex. In all portions of the brain affected, any mesodermal changes, changes in the vessels, were either insignificant or of a secondary character. Hyperemia of vessels,

perivasculär infiltrations, thickening of the walls, proliferation of small vessels and capillaries, "pigmentation" of connective tissue cells, etc., were described in dementia praecox by Weber,<sup>27</sup> Wada, Moriyasu, Anglade and Jacquin,<sup>28</sup> but were ascribed to intercurrent or accidental diseases (senium, arteriosclerosis, alcoholism), and all the authors point out the necessity of excluding pathological changes that are liable to occur in dementia praecox as the result of possible complications. The fundamental changes are to be looked for in the ectodermal elements—the ganglion cells, and the glia tissue which changes, as I said, were mostly found in the frontal lobe, in the second and third layers. The regularity with which the frontal lobe was found to be involved in dementia praecox first led Southard<sup>29</sup> to suggest the possibility of explaining the clinical symptoms of this disease by the anatomical changes of the various portions of the brain. The frontal lobe ("prerolandic group") lesion could, according to Southard, account for the paranoic symptoms, the parietal, (or post-rolandic) the cerebellar involvement for the catatonic symptoms, etc. Kraepelin<sup>30</sup> went somewhat further, and built up an attractive though a highly speculative theory of the pathology, so to speak, of various dementia praecox symptoms. The upper cortical cell layers, according to Kraepelin, are the places where the higher intellectual faculties become elaborated, being thus the principal seat of the intellect. Especially is it true for the frontal lobe, whose lesion could explain the disorders of intellect, of the judgment, of critical and of creative abilities. The lesion of the temporal lobe, also of the small cell layers, would adequately explain the occurrence of hallucinations, and of sensory aphasic disorders, disturbances of will and motion may be ascribed to the motor area lesion, etc. The acting, the thinking, the feeling, are the functions of the small cell layers and like the latter are constantly involved in dementia praecox. The sensory perceptions, the mechanical memory are, on the contrary, well retained, and Kraepelin places these functions in the deeper layers of the cortex. He thus tries to ascribe specific psychical functions to certain layers, though he himself admits that their function is so far totally unknown and Brodmann definitely states that all attempts made to define the possible functions of the layers of the cortex are nothing but "harmful speculations."

Whether the changes in the small cell layers can explain the phenomena observed in dementia praecox or not, the fact seems to be established that the ganglion cells of the second and third cortical layers, especially of the frontal lobe, are frequently found damaged in dementia praecox. The numerous reports relative to the pathology of this disease conclusively prove that only the ectodermal elements, i. e., the ganglion cells and the glia tissue, are involved, the damage often resulting in their atrophy and ultimate cell loss. Yet it must be admitted that the repeatedly described changes, as cell shrinkage, cell loss, glia proliferation, etc., are by no means uniform, typical, or specific for dementia praecox, since similar changes are

to be found, sometimes even more pronounced in any other mental disease or organic brain lesion (meningo-encephalitis, dementia paralytica, manie depressive insanity, etc.). It must also be conceded that this disease cannot be diagnosed microscopically, like dementia paralytica, for instance, and the impression gained from the study of the histopathology of dementia praecox is that this problem is practically in the same state as it was twenty years ago when Alzheimer first revealed his findings. In other words, hardly any progress along these lines has been made since the day of this great neuro-pathologist, which lack of progress, I believe, can be explained by the fact that the essence of dementia praecox lies not so much in *primary* brain changes, as in *some chemical, catabolic, processes* which cause *both* the clinical and the central nervous changes described above.

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### MOTIVE, HYPOTHESIS, SYNTHESIS.

"If we take the letters of a sentence we wish to decipher, and place them in a line, we advance not a step towards the discovery of their meaning. To resolve an enigma, we must have a perfectly clear conception of the problem. There are many ways to the highest pinnacle of a mountain: but those only can hope to reach it who keep the summit constantly in view. All our labor and all our efforts, if we strive to attain it through a morass, only serve to cover us more completely with mud; our progress is impeded by difficulties of our own creation, and at last even the greatest strength must give way when so absurdly wasted." *Liebig*. "Therefore the development of knowledge in science succeeds when an hypothesis is formulated as a basis for investigation. By holding fast to that which is proved as fact and discarding that which is shown to be contrary to fact is real progress made. This indeed has been the case in the history of protein metabolism." *Underhill*.

A STUDY OF THE STATISTICS OF DEMENTIA PRÆCOX FROM  
THE REPORT OF THE NEW YORK STATE HOSPITALS  
FOR THE NINE MONTHS ENDING JUNE 30TH, 1916

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During this nine months' period there were admitted to the New York state hospitals 907 cases of dementia præcox, first admissions (505 men and 402 women).

310 cases were readmitted during this period (169 men, 141 women). Of the readmissions there were 187 cases of the paranoid type (88 men, 99 women), 17 cases of catatonic type (12 men, 5 women), 71 cases hebephrenic type (44 men, 27 women), and 35 cases of simple (25 men, 10 women).

Of the first admissions there were 517 cases of the paranoid type (263 men, 254 women), 80 of catatonic type (50 men, 30 women), 203 hebephrenic (121 men, 82 women), and 107 simple (71 men, 36 women).

The total number of all cases admitted was 7,064, so that an eighth of all admissions were cases of dementia præcox.

464 of these first admissions were under 30 years of age (314 men, 150 women), and 278 cases were between 30 and 39 years of age (136 men, 142 women).

300 of these cases presented no unfavorable family history (158 men, 142 women), while 329 cases were total abstainers and in only 41 cases (35 men, 6 women), or 4.5%, was alcohol given as an etiological factor.

350 cases (189 men, 161 women) were classed as normal temperamentally and 568 cases (305 men, 263 women) as normal intellectually.

359 cases (196 men, 163 women) were classed as abnormal temperamentally and 149 cases (92 men, 57 women) as abnormal intellectually.

603 of these 907 cases were unmarried (407 men, 196 women). 224 cases were married (77 men, 147 women).

546 cases (327 men, 219 women) had a common school education, 41 cases (28 men, 13 women) a high school education, and 17 cases (13 men, 4 women) a collegiate education.

Only 84 out of the 907 cases were from the rural districts.

During the nine months' period there were discharged as recovered but 17 cases of dementia præcox (8 men, 9 women). Nine of these recoveries were from the Rochester State Hospital (4 men, 5 women).

During this same period 536 cases of dementia præcox died (236 men, 300 women). 66 of these cases were under 30 years of age at death and 113 were between 30 and 40 years of age at death.

The greater number of deaths occurred between 35 and 39 years of age and there were 72 deaths.

The cause of death of 161 of the 536 deaths was due to tuberculosis of the lungs. The average age of these cases at death was, men 48.2 years, women 52.9 years, total 50.6 years. The average time in hospitals for the insane of dementia præcox patients dying during this period was, men 15.6 years, women 16.5 years, total 16.1 years.

In the census of patients in the New York state hospitals, classified according to psychoses July 1, 1916, 18,949 cases were classed as dementia præcox (men 8,903, women 10,046) out of a total population of 35,213, or 53.8% of the total population of the hospitals, are cases of dementia præcox.

With these facts before us it is very apparent that present methods of treating these cases are far from satisfactory. With 18,949 cases with a hospital residence of 16.1 years at \$210.00 per year, it will cost New York state over sixty-four million dollars to care for her cases of dementia præcox. These statistics will undoubtedly hold good for other states.

Is it not time that some active steps were taken to prevent and cure this most prevalent of all forms of mental disease?

I can see no reason why cases of this form of mental trouble, who present no unfavorable family history and who have been able to obtain a fair education before the onset of the trouble, should not be cured if active steps are taken upon admission to a hospital.

I also believe that certain cases could be prevented if the school physicians were more familiar with the early symptoms of dementia præcox.

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Heretofore, in Scotland (said Boëthius), if any were visited with the falling sickness, madness, gout, leprosie, or any such dangerous disease, which was likely to be propagated from the father to the son, he was instantly gelded; a woman kept from all company of men; and if by chance, having some such disease, she were found to be with child, she with her brood were buried alive; and this was done for the common good, lest the whole nation should be injured or corrupted. A severe doom you will say and not to be used amongst Christians, yet more to be looked into than it is. For now, by our too much facility in this kind, in giving way for all to marry that will, too much liberty and indulgence in tolerating all sorts, there is a vast confusion of hereditary diseases, no family secure, no man almost free from some grievous infirmity or other.

## THE ROSSOLIMO TESTS IN DEMENTIA PRÆCOX

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A preliminary report<sup>1</sup> on the results of the Rossolimo Tests applied to dementia præcox patients was made at the 1917 meeting of Alienists and Neurologists, in Chicago.

It was shown in this report that the dementia præcox mind, as investigated by the Rossolimo method, is characterized by three conspicuous mental defects, viz., decreased resistance to suggestion, or stated otherwise, increased suggestibility; diminished constructiveness and weakness in observation and reasoning. Since that report was made several additional cases have been studied by the same method. The results of both the earlier and the later work are published in this paper. The patients examined were mainly of the hebephrenic type; only two were classified in the paranoid group. There is no conspicuous difference between the psychograph of these two patients who were Harold Egan and Fred Madaus and that of the hebephrenics. The catatonic patients who are mute could not, naturally, be used in this test which requires the verbal co-operation of the patient.

The Rossolimo test aims at a complete examination of the chief intellectual functions. Nine central, mental, processes were selected. These nine processes are: I, Attention; II, Strength of Will (called Tonus by Rossolimo; called Resistance to Suggestion by me); III, Perception and Discrimination; IV, Memory for many different topics; V, Comprehension; VI, Construction; VII, Mechanical Ingenuity; VIII, Imagination; IX, Observation and Reasoning. The original test required at least three hours. In order to bring the method within the compass of a clinical examination, the author has made a revision<sup>2</sup> of it. The tests of each of the nine fundamental mental processes are graded on a basis of 100. The performance may vary from zero, which is complete failure, to 100 for a perfect response. The result of the examination may be expressed in graphic form by plotting the mental processes on the abscissa and the score for each test on the ordinate. The curve thus derived is the psychograph of the individual. The psychographs of the sixteen dementia præcox patients are shown in Figs. 1 and 2. For purposes of comparison, the composite psychograph of six university students is also shown. This curve was obtained by averaging the results of each of the students in each of the tests. This graph is shown in Fig. 2.

Certain conclusions may legitimately be drawn from the results of

<sup>1</sup>See Proceeding of Alienists and Neurologists, 1917.

The Salient Mental Defects in Dementia Praecox, H. C. Stevens.

<sup>2</sup>H. C. Stevens. A Revision of the Rossolimo Test, Studies in Psychology, Titchener commemorative volume, 1917.

this test. The common defect in all of the dementia *præcox* cases is this increased suggestibility which is evidenced by diminished resistance to suggestion. It may be pointed out that all normal persons are suggestible. Indeed all educational development depends upon the possession of this quality. The composite psychograph of the six normal persons shows a resistance to suggestion of about 80%. But the graphs of the dementia *præcox* minds show a resistance to suggestion equal to zero. Kraepelin<sup>3</sup> has pointed out that the automatism of dementia *præcox* is an evidence of increased suggestibility. Indeed, some writers have urged that the mutism, stereotypy, and mannerisms of dementia *præcox* were only so many expressions of suggestion. Bleuler<sup>4</sup> devotes considerable space to a discussion of this subject. Among other things he says: "In Schizophrenia especially Kraepelin has quite correctly brought negativism into relation with abnormal suggestibility, which expresses itself in command automatism." It is evident therefore that the result which stands out so conspicuously in these graphs, is only the exact, numerical confirmation of a well known fact. The social implications of this fact are very important. One of the early symptoms of this disease is delinquency of various degrees of gravity. It may be vagabondage, forgery, theft, or only a change from social conformity in all matters of minor morals to serious offenses. May one not explain this perplexing phase of the dementia *præcox* personality as a direct consequence of increased suggestibility which makes such persons more ready to accept the promptings and suggestions of bad companions, or, it may be, of their own thoughts than they would be normally? The second conspicuous defect in the intelligence of these dementia *præcox* patients is a lack of constructiveness. The tests for this function were the assembling of dissected pictures, a successful performance of which presupposes a unitary grasp of a total perception. In a sense it is a completion test analogous to the Ebbinghaus test of that name. It involves the same sort of mental reaction as the Healy pictorial completion test, viz., an apperceptive synthesis of dissimilar parts. It is perhaps unnecessary to point out that the adjustment of a human individual to the complex social environment of the modern world requires the operation of just this sort of function. No person could behave normally in complicated situations who was deficient in this quality. The third salient weakness of the dementia *præcox* mind is in observation and reasoning. The tests for these qualities require the analysis of a situation and the drawing of inferences from the observation which is made. The ability of a person to cope successfully with the environment whether it be school, or shop, or factory, or farm or profession, presupposes a power of analysis and inference which together constitute judgment.

We have therefore in these intellectual deficiencies so strikingly brought

<sup>3</sup>Kraepelin, *Psychiatrie*, 8m ed., 1913, vol. III, p. 707.

<sup>4</sup>Bleuler, *Theory of Schizophrenic Negativism*, p. 30.

Fig. 1.

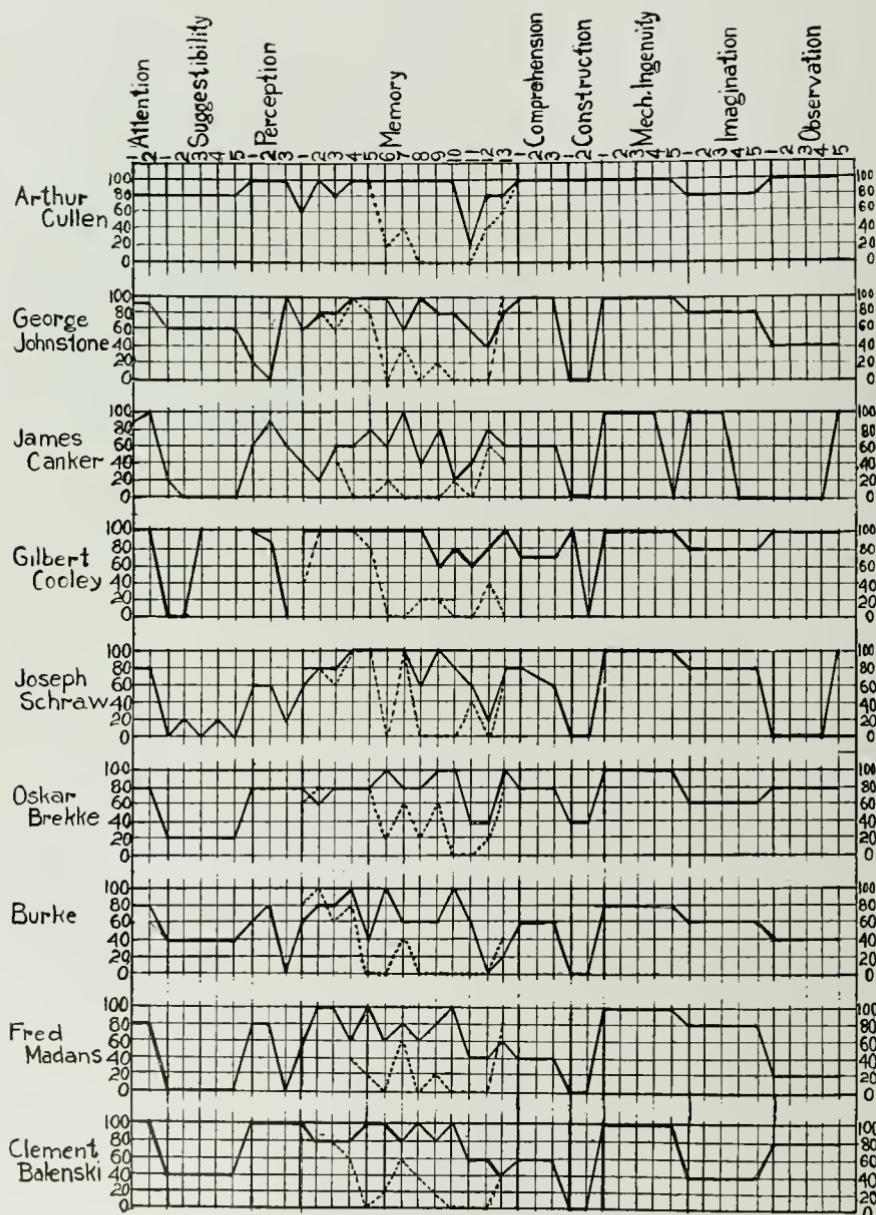
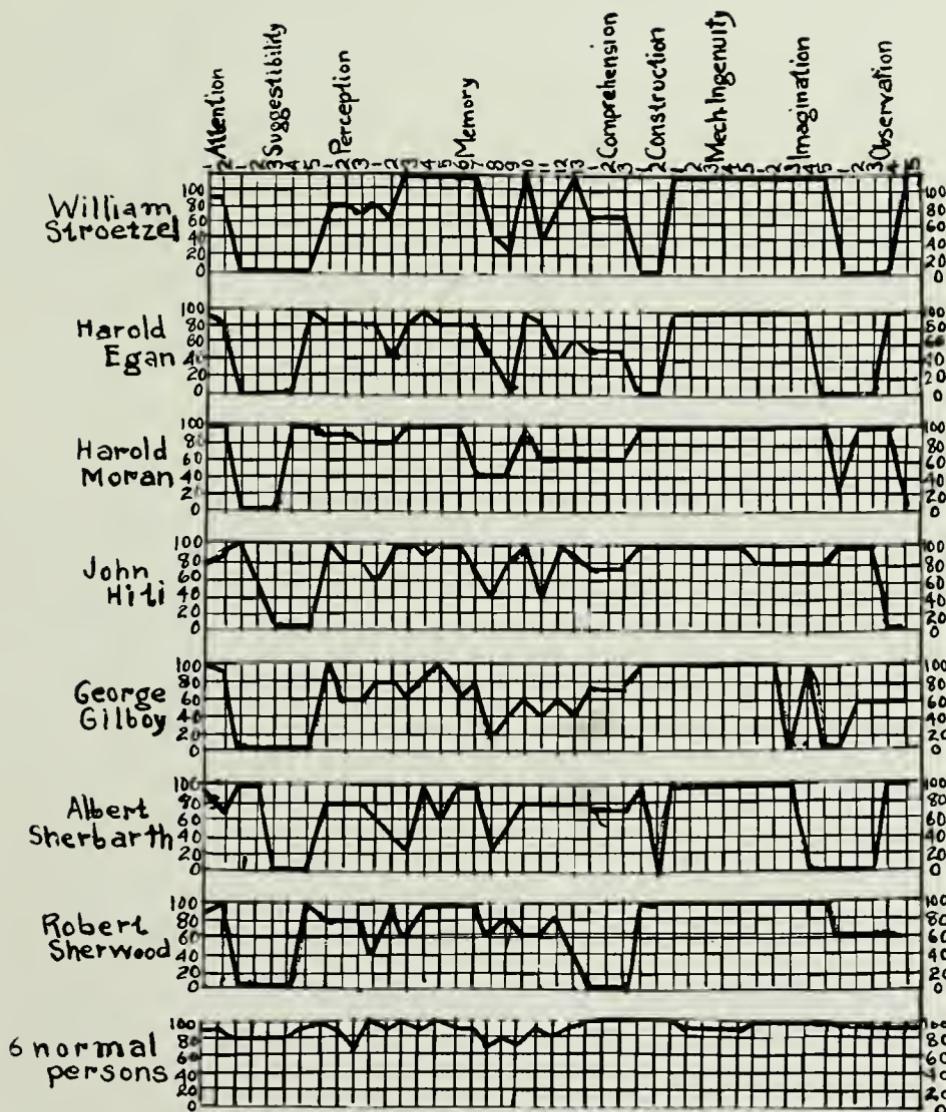


Fig. 2.



out by these tests the clue to much of the dementia praecox behavior, especially that which is characteristic of the hebephrenic and paranoid forms. The delinquency is due to suggestibility and weakness of judgment. The delusions may be interpreted as the uncritical acceptance of suggestions of the sensations from his own body, or from the system of memories which constitute his personality, or from the social milieu of which he is a part. If one accepts Wernicke's classification of delusions as somatopsychic, auto-psychic, and allo-psychic, it is apparent that these three terms refer to the three fundamental aspects of a human personality, viz. (1) the system of sensations arising from one's own body, (2) the systematized memories, associations and ideals of the self, and (3) the social and physical environment in which the human organism finds itself. From all three of these sources come stimuli and impressions which require reactions and adjustments of the organism. With suggestibility greatly increased, the critical attitude of the individual to his environment is diminished. There is thus built up those false beliefs which constitute the delusion. If, therefore, the delusions are to be understood as the results of increased suggestibility, the unsystematic character of them is a consequence of weakness in the power of intellectual construction.

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It is a gross mistake to suppose that management systems usually applicable to a factory can be applied to a college or a university, to an experiment station or to a research laboratory, and for the very good reason that the products are wholly unlike—manufactured goods in the one case, human souls and scientific truth in the other. So also are the methods of procedure unlike—time-work and a measurable output in the one case; study, reflection, mental recuperation, inspiration, soul-service in the other.

*L. H. Bailey.*

# THE ABDERHALDEN REACTION IN THE DIAGNOSIS OF LOCAL CHANGES IN THE BRAIN AND OTHER ORGANS

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The subject of my paper is the summing up in a few chosen cases the work on the utilization of the Abderhalden dialysis method for locating lesions in remote parts of the body inaccessible to ordinary clinical examinations.

I wish to repeat in a few words the original theory of Abderhalden which, although differing essentially from the one developed during my work, seems to explain the facts in a simple way.

According to Abderhalden the presence in the host of any foreign protein causes the development of ferments which, defending the body from intoxication, tend to destroy the foreign protein, changing it into simple bodies which may be either excreted or utilized for building up purposes. Hence the name "defensive ferments." According to that theory the protein or organ is foreign to the organism when it is not physiologic, that means not only the protein introduced parenterally, but the host's own organs if, by any chance, they cease to be physiologic. That would further mean that any hypo or hyperfunction or dysfunction in general will cause the manufacture of defensive ferments.

These ferments are capable of destroying the foreign protein not only *in vivo*, but just the same outside of the organism. Therefore, if we place a piece of . . . perhaps placenta which is a foreign tissue in the mother's organism, together with a pregnant woman's serum, the ferments contained in it will digest the placenta and if we consequently place the serum in a half permeable thimble the digestion products—peptones and aminoacids—will dialyze out and be easily found by any suitable reaction. The ninhydrin is the most convenient reagent known.

There is no need to explain that we may use any other tissue besides the placenta, and as far as my experiments go, the reaction is perfectly specific, which I shall attempt to prove by discussing the few cases on the chart.

The three cases of acromegaly all show a very strong positive reaction with anterior pituitary, which in acromegaly is the location of the tumor. The reaction to the occipital vision center in case 3 suggested the idea of visual trouble, caused by atrophy of that portion of the cortex, secondary to pressure of the pituitary on the chiasm and the optic nerve. The patient is blind. I want to call attention to the fact that I try not to know, before the test is completed, anything about the patient which might in any way influence my work.

This case represents a young girl whose serum was sent to me with the label "pineal gland disease." For that reason, as you can see, I started two experiments with pineal-tissue, and both turned out negative. As I imagined that the diagnosis might have been made because of precocious sexual development and because that development might be caused by a hypofunction of the posterior hypophysis as well, and my experiment showed this tissue to react positively. I suggested the diagnosis of posterior pituitary insufficiency, which was accepted. This was the only case in which I was told beforehand what was thought to be the matter.

The case called "lues of spinal cord" has paralyses, which indicate gumma extending from the medulla oblongata over the cervical region of the spinal cord in complete accord with my results.

The case of motor-speech aphasia and hemiparesis is that of a telephone girl who received an electric shock while discharging her duty. In consequence she lost speech, became mentally degenerated and was permanently paralyzed on the left side. The reaction when repeated a month later showed no appreciable difference. The frontal association center reaction accounts for her mental symptoms, while that with the motor-speech area is self-explanatory.

I brought into that chart the three cases of chorea to show the reaction with the motor area and with the corpus callosum. This reaction repeats in all the cases of involuntary movements or twitchings, and can be seen in the two cases of epilepsy. This record depicts the reaction as it was applied to a male epileptic who was bled during the spell, and shows a very profuse irritation all over the brain, and another reaction of the same patient in times of absolute quiet. The next reaction is that of his sister who came to the hospital with the diagnosis of multiple sclerosis. After having made the reaction and seeing its absolute identity with that of her brother I made the tentative diagnosis of epilepsy, with night attacks only or no attacks as yet. This proposition was not accepted, but several months afterwards I was notified that the patient had had her first attack.

The case called "infantilism" improved greatly on anterior pituitary treatment checking up in that way my reaction and showed in the same time another peculiarity. Having a very large goiter this patient gives only a faint reaction with the thyroid tissue. I explain it in the following way: The hormonic cycle is apparently all upset and the adrenals most probably, as in all those cases, not working sufficiently well—strong reaction—do not supply enough secretions necessary for the organism. The thyroid, as is known to happen in such cases, takes up the balance of work left undone by the adrenals, and consequently increases in size, not losing much of its physiological state—very weak reaction.

The four cases of eclampsia really do not belong in this chart, but I included them because they show a striking regularity. The two cases

### Chart Showing Abderhalden Reactions

which died show a questionable reaction with parathyroids and a strong one to thyroid and liver, while those which recovered react strongly with parathyroids and not at all with liver or thyroid. This fact may give suggestions for explaining eclampsia. The convulsions may be of parathyroid origin as parathyroid tetany, due to accumulation of methylcyanamide and trimethylmelanin. If the parathyroids are completely destroyed, which fact will show itself by a negative reaction on account of the lack of specific tissue for the ferments by which to be formed, the thyroid and liver are overworked, detoxicating the organism, become damaged themselves and give the picture of profuse destruction found in autopsies. While in cases where the strong reaction with parathyroids shows that there is still some specific glandular tissue present, the intoxication can be overcome and the patient recovers. I would suggest that a positive reaction with the parathyroids and a negative one with liver and thyroid is a hopeful sign and in every case the reaction ought to be performed with at least those three tissues, since the patients are bled amply anyway.

The next cases are patients with the clinical diagnosis of dementia precox on the date of admission. Not all of them proved to be such after extensive work was done on them in our laboratory. The reason they are on this chart is this: During my Abderhalden work the idea of specificity developed so strikingly that I attempted to correlate delusions and hallucinations with changes in the cerebral cortex. The cortex was dissected into areas corresponding to different senses in an approved way for localization. Now I started a series of reactions on dementia precox patients with delusions, without, as usual, knowing anything about the patient at the time of the experiment. Here are the results with a few clinical notes explaining the cases:

Joe Sehray has great speech difficulties and has auditory delusions which he admits. His serum reacts positively with both the corresponding cortical areas.

George Johnson turned out in later examinations not to be a dementia precox patient at all. The reaction with the occipital vision center seems to me a secondary manifestation to the reaction with the pituitary. An X-ray examination of the sella turcica made by Dr. Blaine of the Cook County Hospital showed a small sella with a great enlargement of the posterior clinoid processus. Consequently there is pressure on the pituitary as a whole with possible hypoplasia and secondarily, through the optic nerve, change in the cortex. The patient denied any delusions, but was caught many times laughing to himself and talking to imaginary persons.

Edward Evenson admitted as dementia precox, proved to be feeble-minded, of the moron type. He is not demented, but amented; has no

changes, but undevelopment of the brain cortex, and consequently does not show a positive Abderhalden reaction with any area of the cortex.

Edward Burke has visual delusions, is very depressed and is in a constant state of mental confusion.

Gilbert Cooley is mentally slightly degenerated, has ideas of persecution and auditory delusions. He has cecal stasis of very long duration. The Abderhalden shows a negative reaction with cecum as antigen and a positive one with ileum and appendix. Since we know that the Peyer's patches and the lymphoid tissue in the appendix are quite identical we might presume that they have something to do with the stasis, especially since Whipple proved that in cases of intestinal obstruction the parts before the obstructed areas are the ones where the absorption of poisons takes place and that changes in permeability of the cell membranes are the cause of it. That reaction repeats in every case of cecal stasis whether it is dementia precox or not; and it seems as if the difference in the poisonous substances permeating into the circulation would decide the quality of the intoxication symptoms.

James Cankar and his brother Adolf both show disturbance of the intestinal secretions and intestinal reactions due to stasis. James is constantly confused but not disoriented, negativistic and over a week out of catatonia; while Adolf is catatonic at the time of the test and shows in an ophthalmologic examination conducted two weeks after the Abderhalden, "blurring in the margin of disc in both eyes and slight optic neuritis in right eye," which must account for his reaction with the vision center.

The jaundice case is one of the most striking experiments I have ever made. A good friend of mine, himself senior student of medicine, asked me to perform an Abderhalden reaction on his serum in order to decide the cause of his jaundice and general ill feeling connected with impossibility to work mentally. The positive reaction with gall-bladder, pancreas and liver accounts for his jaundice, while that with the kidneys indicates surely that they cannot carry such an unusually great amount of an unusual substance. He has cecal stasis. Not knowing anything concerning his brain, the reaction with brain tissue puzzled me. I could plainly see that there must be a visual disturbance because the visual path is marked almost perfectly by positive reactions; fibers from the occipital lobe of the cortex run through the optic thalamus into the pons. On that account I questioned him concerning possible delusion of vision. After long coaxing he admitted the following: Six years ago he was bitten by a rat and following infection most probably of the spiroylla Obermeyer, had double vision for several years before wearing glasses and disregarding one of the pictures corrected that fault. The case was clear to me. The spiroylla similarly to its cousin the spirochaeta pallidum after ravaging in the organism generally, placed itself in the occipital lobe of the brain,

fortunately not knocking out the whole cortex as the spirochaeta does in general paresis.

The last case is brain tumor. The patient is in the Anna State Hospital and I do not know anything about his clinical findings, but the reaction is such a clean cut experiment that, even so, I venture to describe it. The most prominent reaction is that with the optic thalamus and cerebellum and suggests a tumor between them, probably on the corpora quadrigemina overlapping on the neighboring tissues. If you follow the fibers running from the occipital vision center and those from the frontal association area, you will find that they cross almost exactly in the same spot.

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Dementia precox must undoubtedly have always existed and have been observed by physicians, and in particular the grotesque cases of catatonic rigidity and peculiar mannerisms must have always attracted attention. In the early history of psychiatry, however, few descriptions of cases exist that could be unequivocably said to be cases of precox, as the group had not been defined from other groups superficially resembling it, as for example, imbecility. Willis, the English anatomist, recognized as early as 1672 that many young people underwent deterioration, and Sydenham, a hundred years later, in 1772, recognized similar conditions under the description of stupidity, while later on, after mania and melancholia had been more or less defined, many of the excitements and depressions that are incident to the course of dementia praecox were undoubtedly grouped under these headings, while at one period, only a few years ago, there was a distinct group supposedly representing a special disease described by the name of catalepsy, where also undoubtedly a certain number of precox cases were arranged.

In 1896 Kraepelin, in the fifth edition of his *Lehrbuch*, arranged dementia praecox, catatonia, and dementia paranoides as disorders of metabolism. Clouston, the Scotch psychiatrist, had already described what he termed adolescent insanity and objected to the term dementia praecox as being too inclusive. Kraepelin, however, worked over his material with great thoroughness and arrived at the concept that includes the three forms of hebephrenic, catatonic, and paranoid by tracing the life histories of his patients and grouping all these cases, however dissimilar they might appear on the surface, from the standpoint of prognosis. They were cases that had a fairly definite course and outcome, eventuating always in a certain degree of dementia.

*Jelliffe and White.*

## CATATONIC DEMENTIA PRÆCOX.

### REPORT OF A CASE SHOWING A MARKED REMISSION FOLLOWING APPENDICOSTOMY WITH COLONIC IRRIGATION.

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In an article entitled "The Relation of Cecal Stasis to Dementia Praecox," published by Bayard Holmes, M. D., and Julius Retinger, Ph. D., in the Lancet Clinic, August 12, 1916, and a previous article by the same authors published in the Medical Record, May 6, 1916, the possibility of a cecal stasis in dementia praecox, with the absorption of certain toxines, was shown to be extremely probable.

In the article of May 6, 1916, the statement is made "that many dementia praecox patients have been operated on for appendicitis at the beginning of their breakdown, and many others have complained for a long time before their breakdown of abdominal disturbance, and they have given expression to toxic symptoms such as attend attacks of biliousness and constipation."

In the following case of catatonic dementia praecox, which is fairly typical, the onset and course with the physical signs, compel the belief that the patient suffered from some severe intoxication. The remarkable recovery, following the attack of dysentery and the colonic irrigation, seems to be of more than passing interest. Hence the report of the following case:

*CASE No. 6326. Family History:* Paternal grandmother was a case of senile dementia. Patient's father was killed by lightning five years ago. He was a moderate user of alcoholics. His mother is living and well. With the exception of the paternal grandmother, the family history is negative for chronic alcoholism, mental and nervous diseases.

*Personal History:* Patient was eighteen years of age on admission. His father was thirty-seven years of age and his mother twenty-four when he was born. Birth, normal. He learned to walk at one year of age and talked at three years of age. He had measles, whooping cough, mumps and chickenpox as a child. He suffered from night terrors at times, and was considered a nervous child. He frequently masturbated. He acquired knowledge rapidly. He was quiet, well behaved and sociable. He attended school from six to seventeen years of age, was considered studious and advanced as rapidly as the average pupil. His only employment was farm work.

*Present Illness:* The onset of the patient's illness began one year and eight months before admission to this institution. He had been playing football at school and returned home for supper complaining that he was so nervous that he could not eat. He trembled continually all the next day and hiccupped for two days. He was sent to a physician who said, "He belched quantities of gas almost continuously." He lost twenty pounds in weight. He did not show any marked depression or psychomotor activity. During this time he was indifferent, untidy in habits and careless of his personal appearance. It became necessary to tube feed him. He became suicidal and required supervision. He was noisy and destructive at times

and at other times would become rigid, resistive or negativistic. He did not answer questions and did not appear to be interested in what transpired about him. He would assume awkward postures and maintain them for indefinite lengths of time. His weight fell from one hundred thirty-four pounds to one hundred twelve pounds. The attack subsided somewhat at the end of six months. The mother states the family physician gave him "Thyrodectine" and prescribed a nutritious diet.

After a remission of eight months the present attack began with symptoms similar to those of the first one, but more severe, and it became necessary to tube feed him and guard against possible suicide. On account of this, he was committed to this institution June 9, 1915. At the time of the judicial inquiry he sat rigid, staring straight ahead with pupils dilated, saliva drooling from his mouth and apparently uninterested in the proceedings.

*Physical Summary:* White male, age 18. Height, 6 ft. 1 in. Weight, 110 lbs. Poor state of nutrition. Respiratory system, negative. Examination of cardiovascular system shows rapid heart action (pulse, 130), cyanosis, especially of the extremities. Gastrointestinal examination shows excess of saliva with its retention causing it to drool from the mouth, and chronic constipation. We also have a history of eructations of gas during the onset of the psychosis. In the genitourinary examination the genitalia were found to be poorly developed. Urinalysis was negative for albumen and glucose.

The neurological examination was negative except markedly dilated pupils, which reacted poorly to direct and consensual light and accommodation. The patellar reflexes were markedly exaggerated. Organic reflexes, not involved except occasional untidiness, due probably to indifference.

*Summary of Mental Examination:* Since being received June 9, 1915, this patient has been stupid and indifferent and does not answer questions. When first admitted, it was necessary to tube feed him. Occasionally he would eat if fed with a spoon. After several days he could be persuaded to eat more, and his physical condition improved to some extent. He began to show a little more interest in his environment, but did not answer questions or volunteer any remarks. He would sit in one position staring straight ahead until led away. He would retain his saliva until it drooled from the corners of his mouth. He would not co-operate in any way in the physical or mental examination and as a result it was impossible to make a complete mental examination. One month after admission it was necessary to put him to bed on account of general weakness due to his continual refusal to take sufficient nourishment. He was mute and showed other marked symptoms of catatonia. A note three months later states that the patient continues confined to bed and is extremely emaciated. He does not answer questions. He has periods of constipation varying with bloody diarrhea and an occasional slight rise in temperature. At times he eats ravenously, but he usually refuses food. He does not talk as a rule and does not co-operate. He occasionally sings for a day at a time, using very profane and vulgar language. The examination of the stools showed amebic dysentery. This condition did not improve under treatment of two-thirds of a grain of emetin twice a day hypodermically.

A note December 3, 1915, states that on account of the dysentery an appendicostomy was performed by Dr. Weber of Peoria. The appendix was found to be adherent to the tip of its mesentery. The adhesion was ligated and divided. The appendix was brought up into the wound and the peritoneum sutured to it. The muscular and facial planes were sutured and the appendix amputated. A catheter was passed through it and the colon irrigated with quinin solution.

A note February 19, 1916, states that patient shows marked mental and physical improvement. He has some insight. States he believes his mind was affected and that he did not come to himself until some time in January. He makes in-

quiry as to when he can go home and shows a nearly normal interest in what transpires about him.

June 18, 1916, he was discharged as improved. He had gained twenty pounds in weight. His mental condition showed marked improvement. He had good insight, stating that he realized that he had had some mental trouble when admitted here and that he seemed to come to himself shortly after the operation. He was anxious to go home and showed a practically normal interest in everything. A letter from his mother, dated March 27, 1917, stated that his weight was one hundred fifty-six pounds and that he was in better condition both mentally and physically than when he left here.

In conclusion I will state that I am well aware that the irrigation of the colon, with the possible elimination of certain toxic substances, may not have had anything to do with the patient's marked mental improvement. The catatonic dementia praecox frequently remits without any unusual treatment or following various surgical operations and fevers.

Regardless of the occasional remission without special treatment, I believe that a number of appendicostomies with colonic irrigation should be done and the results published. In trying to discover the etiological factor or factors producing this patient's illness we are compelled to consider the possibility of a toxin playing the chief rôle. Many prominent symptoms given in the above history point to a physical basis for the patient's psychosis, viz.: the rapid heart, dilated pupils, deranged gastrointestinal tract shown in the eructation of gas and chronic constipation, cyanosis, rigidity of muscles or so-called resistiveness, and the exaggerated patellar reflexes, the latter being found in all cases of dementia praecox.

The above symptoms are sufficient to indicate a physical basis on which this condition arises. Close observation of the symptoms of the average case of catatonic dementia praecox will show remarkable similarity to the symptoms of certain cases of infective or toxic exhaustive psychosis. This fact has led me to report this case of catatonic dementia praecox which is in no way different from the average case.

In closing I will add that in other types of dementia praecox the symptoms, both physical and mental, would seem to warrant the assumption that a toxin is the main etiological factor. The pathological changes found to exist post mortem in the endocrine glands of the dementia praecox subject can best be explained as due to the action of a toxin. This subject offers a fertile field for research and our institutes for research could not employ their time and money to greater advantage.

## ADRENALIN MYDRIASIS AS A SOMATIC SYMPTOM OF DEMENTIA PRÆCOX AND ORGANIC BRAIN DISEASE.\*

By SOLOMON C. FULLER, M. D., and FIRST, LIEUT. RALPH M.  
CHAMBERS, M. R. C.

In this study of one hundred subjects, all patients of Westborough State Hospital, a clinico-diagnostic application is attempted of the principles underlying certain experiments on warm and cold-blooded animals respectively. The experiments to which we refer concern the reaction of the pupil after adrenalin instillation into the conjunctival sac. At the staff conference a surprisingly fair degree of unanimity prevailed as to diagnoses in these cases, but in every instance the official diagnosis (based generally on majority opinions) determined the classification.

Before going further, it might be well to refer briefly to the general effect of adrenalin on the nervous system, and especially to certain apparently well-established facts regarding its action on the cervical autonomie system that part of the nervous apparatus most probably concerned in the phenomena here discussed. From intravenous injections of adrenalin into rabbits, Lewandowsky<sup>1</sup> (1898) arrived at the conclusion that this substance was a depressor hormone, having a special affinity for structures innervated by the sympathetic. The effect of adrenalin thus administered was quite the same as that produced by mechanical irritation of the cervical sympathetic ganglion. These experiments have been frequently confirmed and greatly elaborated, as a reference to the critical reviews of Biedl<sup>2</sup> and Cords<sup>3</sup> will show. The general unanimity of opinion which now prevails regarding the action of adrenalin may be illustrated by the following almost axiomatic statement in a recent paper (*Interrelation of the Emotions*) by Walter B. Cannon.\*

"The adrenal glands produce a substance (adrenin, epinephrin, or adrenalin) which, in extraordinary minute amounts, affects structures innervated by the sympathetic precisely as if they were receiving nervous impulses. Thus adrenalin injected into the blood will cause dilated pupils, erect hairs, rapid heart, constricted bloodvessels, inhibited activities of the alimentary canal, and liberation of sugar from the liver."

The adrenal glands themselves are innervated by the preganglionic fibers of the autonomic group. Any stimulation of these fibers results in an outpouring of adrenal secretion into the blood stream. (Elliott, T. R.)<sup>5</sup>

Experimental data in neurophysiology have been amassed which tend to show that the superior cervical sympathetic while it may not be completely inhibitory, in so far as concerns purely muscular dilation of the iris, does have a restraining influence. Thus when this ganglion is shunted from the nervous path by reason of disease or by extirpation, the iris becomes more sensitive to mydriatic substances.

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\*From the Westborough State Hospital, Westborough, Mass.

In experiments on the cat's brain, Shima<sup>6</sup> has shown that disturbances of the cerebral convexity in the region of the suprasylvian gyrus and the anterior perforated space on the basis lead to a contra-lateral mydriasis after adrenalin instillation. The same result also follows disturbances of the medulla and spinal cord as far downward as the seventh vertebra.

The experimental data as it touches the procedure employed in the study of our Westborough material may be thus summarized:

(1) Instillation of adrenalin into the conjunctival sac of normal warm-blooded animals (rabbits) has no effect on the pupil.

(2) If the superior cervical ganglion of a warm-blooded animal has been extirpated, and sufficient time has intervened between operation and experiment, mydriasis follows the instillation of adrenalin into the conjunctiva.

(3) Instillation of adrenalin into the conjunctiva of normal cold-blooded animals (frogs) is followed immediately by mydriasis, without a preparatory operation.

Not only in the sympathetic and central nervous systems do special changes dispose to adrenalin mydriasis, but changes elsewhere in the organism may be productive, or at least accompany the phenomenon. As examples, operations on the pancreas have been followed by a mydriatic reaction of the iris to adrenalin and certain diabetics will display an adrenalin mydriasis quite as readily as pancreas operation cases or certain dementia praecox cases. Irritation of the peritoneum, injuries of the duodenum, thyroid feeding, ligation and fistula of the thoracic duct are also supposed to make possible adrenalin mydriasis. Here, of course, sympathetic involvement cannot be positively ruled out, neither can it be confidently assumed. While one might hesitate to say that disturbances of the internal secretions produce a susceptibility of the iris to adrenalin, evidence is not wanting to show that the two are often associated. Among other factors which favor adrenalin mydriasis are a readily permeable cornea and solutions in the continuity of the surface of the conjunctiva.

The diagnostic application of adrenalin mydriasis has been undertaken by Cords for sympathetic paralyses, by Zak<sup>7</sup> for organic affections of the central nervous system (hydrocephalus, encephalitis, multiple sclerosis), and for the psychoses by Antoni<sup>8</sup> of Stockholm and by Schultz<sup>9</sup> from Binswanger's clinic. The Westborough study was undertaken with the view to confirm or refute the work done by previous observers on subjects suffering from psychoses and to determine the availability of the test as a clinical diagnostic procedure.

Of 60 cases of dementia praecox studied by Schultz approximately 50 per cent were positive, approximately 15 per cent questionable, approximately 15 per cent negative and approximately 15 per cent miotic—so-called paradoxical reaction. Schultz's cases of uncomplicated neuroses and functional psychoses, excluding dementia praecox, were negative, with one ex-

ception. This group included 39 cases which Schmitz classified as follows: Hysteria 9, psychopathic constitution 3, imbecility 3, imbecility with hysteria 2, melancholia 13, mania 2, cyclothemia with Basedow's disease 1, degenerative psychoses 3, hypochondria with arteriosclerosis 2, paranoia 1. One of the cases classed as degenerative psychoses gave a positive reaction.

Among 20 cases of dementia praecox studied by Antoni 9 or 45 per cent gave a positive reaction, but he also claims to have observed the reaction when the test was applied to a number of other subjects, insane as well as mentally sound persons and persons suffering from somatic diseases.

While some cases of organic brain disease will give a mydriasis after adrenalin instillation, as pointed out by Schultz and as we have also observed, it is obvious that for the purposes of this test dementia praecox and cases of manic-depressive insanity are the groups of greatest clinical interest. Inasmuch as there are reliable biological and neurological tests which enable us to differentiate a paretic or an arteriosclerotic with focal lesions from a case of dementia praecox, the positive reactions in organic brain disease may be discontinued. But dementia praecox and manic-depressive insanity are frequently quite difficult to separate. If typical manic-depressives never give a pupillary reaction to adrenalin and a large percentage of dementia praecox cases do, then it is manifest that in adrenalin mydriasis we have a clinical test of some worth, a test, moreover, which is easy and may be performed by almost anyone.

Our material which we consider fairly representative of the general run of hospital cases included 48 cases of dementia praecox, 13 manic-depressives, 4 cases in which there was question as to dementia praecox or manic-depressive insanity, 13 paresis, 4 arteriosclerotics with focal symptoms, 4 simple senile dementia, 4 alcoholic insanity (including 2 alcoholic hallucinosis, 1 recovering delirium tremens and 1 Korsakow's psychosis), 5 imbecility, 2 hysteria, 2 epilepsy and 1 myxedema with numerous hypochondrial delusions.

*Method of Procedure.* The patients were placed in a recumbent position, in a partially darkened room (drawing the shades of the ward or single room, as the case might be). A 1:1000 adrenalin hydrochloride solution was employed. Six drops of the solution were instilled into the conjunctival sac of one eye, 2 drops at a time at 2-minute intervals. The other eye was untreated and thus served as a control. Both eyes were then closed and a folded towel laid over them. After an elapse of 10 minutes the reading is made, though sometimes it is necessary to wait as long as an hour before the reaction takes place, since this varies considerably. Sometimes the reaction fails for the reason that the adrenalin solution has run down the face instead of entering the conjunctival sac. Thus in all negative cases it is well to examine the conjunctiva for blanching. If this be absent then one may be sure no adrenalin has entered the conjunctival sac. The reading

may be made by daylight or by electric flash. We have found the former preferable.

The mydriasis thus produced frequently lasts 24 hours and we have observed several instances where it remained 2 days. In no instance was the mydriasis permanent.

In the table which follows the number of cases for each group, the sex, number of positive and negative reactions, as well as the number of paradoxical reactions (miosis instead of mydriasis) are all given and the percentages worked out. The table, we believe, is as descriptive as any extended verbal description might be.

Diagnosis	Men	Women	+	Paradox.	-	% *
Dementia praecox .....	15	33	26	8	14	71
Manic-depressive .....	5	8	..	..	13	..
Manic-depressive or dementia praecox .....	1	3	2	1	1	75
Paresis .....	9	4	2	4	7	46
Arteriosclerotic insanity .....	2	2	1	..	3	25
Senile dementia .....	3	1	..	..	4	
Alcoholic insanity .....	2	2	1	..	1	25
Imbecility .....	1	4	1	1	3	40
Hysteria .....	..	2	..	..	2	..
Epilepsy .....	1	1	..	..	2	..
Myxedema .....	..	1	..	..	1	..

\*Percentages include miotic reactions. Thus 71% dementia praecox reactions mean 54% + (mydriasis) and 17% paradoxical (miosis).

#### SUMMARY AND CONCLUSIONS.

In the study of these 100 cases, 48 of which were cases of dementia praecox, 71 per cent gave a reaction after adrenalin instillation—54 per cent a mydriasis and 17 per cent a miosis or so-called paradoxical reaction. The remaining 29 per cent of dementia praecox cases were negative.

There were 13 cases of manic-depressive insanity. None of these gave any sort of reaction.

Of the 4 cases which were of questionable diagnosis—dementia praecox or manic-depressive, 2 gave mydriatic reactions and 1 miotic. Since this study was completed, December, 1916, the case in this group which gave a negative reaction has been definitely classified as manic-depressive. The patient made a good recovery and has been discharged from the hospital. The three remaining cases from their subsequent histories are, in the writer's opinion, cases of dementia praecox.

Thirteen cases of paresis gave reactions in 46 per cent.

There were no other positive reactions excepting in the case of 1 arteriosclerotic and 2 cases classed as imbeciles whom the writers believe might well be classed as cases of dementia praecox with early onset.

On the basis of this study we believe that in adrenalin mydriasis a valuable, though not absolute, clinico-diagnostic test for differentiating

dementia praecox from manie-depressive insanity is available. The test has the advantage of being easily performed and requiring no more complicated apparatus than a medicine dropper, but like many an other single clinical test does not eliminate the necessity of thorough-going study of individual cases. Even though cases of paresis and cerebral arteriosclerosis with focal lesions yield a fairly high percentage of reactions, reaetions in such cases do not invalidate the test in the field of its greatest application—the differentiation of dementia praecox from manie-depressive insanity. The physical and biological means of identification for arteriosclerosis and paresis render them easily recognizable.

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La démence précoce est une psychose characterisée essentiellement par un affaiblissement psychique spécial, à marche progressive, survenant en général dans l'adolescence et se terminant le plus souvent par l'anéantissement de toute manifestation de l'activité mentale sans jamais compromettre la vie du malade.

*Sérieur.*

## A PERSONAL VIEW OF THE VICTIM OF DEMENTIA PRÆCOX.

BY BAYARD HOLMES, B. S., M. D.

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Dementia præcox is a disease that comes on in early life. It derives its name from this fact. *Præcox* is not exactly an antonym of *senilis* but as an adjective it was first used by Pliny in the sense of early ripe or premature and promptly adopted by the medieval authors. *Dementia senilis* was in early use to describe the loss of mind which occurred in the aged. The French writers first used *précocè* in describing a dementia coming on in early life and the term became fixed in 1893 by Krapelin's classification in the first edition of *Die Psychiatrie*.

The age of patients on commitment does not always coincide with their age at the onset of the disease. The peak of a curve of age on commitment is between nineteen and twenty-five. The five percentiles reach from five on one side to fifty-five on the other.

It is impossible to estimate the frequency of this disease at any given age or its geographical distribution in the United States or elsewhere. It is not mentioned as a cause of death in the mortuary tables nor in the census of the United States. In 1910 the number of commitments from all insanities to the 400 hospitals for the insane in the United States was a little more than 60,000, and there is good reason to believe that no less than 15,000 of these were cases of dementia præcox. In the Peoria (Ill.) State Hospital 60 per cent of the more than 3,000 patients are cases of dementia præcox. They had been presented at staff meetings, and still remained in the hospital in 1917, when a census was made with the diagnosis of dementia præcox. Among 1,200 patients at Yankton State Hospital, 70 per cent are dementia præcox patients. There is no reason to believe that this ratio is essentially different in other institutions. If, therefore, 60 per cent of the 220,000 patients in the asylums of the United States are suffering of this disease, there are no less than 130,000 dementia præcox patients in custody today.

Criminologists recognize that a large proportion of the convicted adolescent prisoners in reformatories and penitentiaries are suffering of dementia præcox and many odd and simple persons, as well as many vicious and erratic men and women living at home or wandering about the country, undoubtedly are dementia præcox patients though they have never been caught in any act that resulted in commitment or conviction. A very large number of prostitutes are said to be afflicted with this disease, though my own observations do not indicate that the proportion is so large as has been asserted. In any case it is safe to conclude that there are a quarter of a million cases of dementia præcox in the United States or one in every four hundred inhabitants.

Unfortunately the death rate from this disease is unknown. It is well

recognized that many suicides are dementia praecox patients, and attempted suicide in a considerable number of cases is the first recognized symptom of the disease. In the institutions of the State of New York during a period of ten years the deaths from dementia praecox occurred after an average custody of fifteen years. Doubtless the life of these patients in institutional custody is quite as long as the lives of the many secreted patients who are hidden in attics and pens of private houses or kept in the poor house and jails of states where local care of the insane prevails. Not long ago a venerable farmer died in a staid community in Wisconsin. His death discovered to the astonished neighbors that an insane son of the family had been kept in the windowless attic of that farmhouse for more than twenty years, ever since he had been a boy of eighteen. Some years ago a dementia praecox man of forty was removed from a pen in the orchard of a farm in Vermont, where he had been secreted for fourteen years. Many dementia praecox patients refuse to eat and in consequence die of acute starvation during the first episode or attack of the disease. On the other hand, many patients though mute, inactive and untidy, live to be very old. Not long ago a patient whose commitment papers were dated 1852, was transferred to the Peoria State Hospital. The man was eighty-four years old.

The causes of death are not etiologically related to the disease. Suicide is no more related to dementia praecox than to pneumonia or alcoholie delirium. Patients kept in institutions are prone to tuberculosis and this terminal condition has been looked upon by many keepers of the insane as an essential accompaniment of dementia praecox. One professor of psychiatry expressed this opinion to me and remarked that it was a blessed consolation to offer the bereaved parent of an afflicted youth! The examination of many patients in the early stage of dementia praecox has convinced me, however, that the two conditions are related only by way of under nutrition and by direct contagion incident to institutional custody and restraint. There seems to be nothing gained from the inspection of the causes of death in this morbid psychosis.

The dementia praecox patient comes from every walk of life and he is to be found among all races and nationalities. It is certain that the highly developed and the more primitive groups both furnish typical examples of this disease. Many highly educated youths, many artists, many musicians and dancers, come to the State Hospitals with this disease. Some stupid, almost feeble-minded youths come, too, with equally unmistakable evidences of dementia praecox. In the same institution may be found the son of a governor of a state, the sister of one of the most successful captains of industry, and the brother of the most respected philanthropist of the age! In the same wards are insane twins and three insane brothers and sisters from a family with six normal and healthy children not yet insane!

It is said by some investigators that heredity is a dominant factor in the incidence of dementia praecox, but no studies have been made with the

accuracy required by modern biometric science from which such a conclusion may be drawn. If one dementia praecox patient appears in every five hundred of population and a normal family consists of five persons, then the condition should appear in every one-hundredth family. But the dementia praecox patient is short-lived, living less than fifteen years after commitment. It takes at least two such patients to live out the expectancy of one. Consequently the average of one dementia praecox patient in each fifty families would be necessary. In any case the disease is more common than the public is disposed to assume.\*

The onset of the disease is usually subtle. It is attended by many physical and mental manifestations that are harmless episodes in the lives of perfectly healthy individuals. These episodes often hark back to some sickness, accident, or mental strain. In a very considerable number of cases there is a history of infectious, febrile conditions followed not too closely by episodes of diagnostic import. In one case it is an attack of grip with high fever and delirium; in another it is an appendicitis, peri-appendicular abscess and drainage. In one it is a street car accident with compound fracture of a leg; in another it is an injury to the head with concussion of the brain. In one instance there had been an osteomyelitis of the femur, with scraping out of the infected sequestrum; in another there was double chronic mastoiditis following an acute infection. Probably in the great majority of cases, however, no trauma and no sickness can be detected in the history that can be accused of initiating or heralding the disease. Out of a perfectly clear sky the most horrible of human tragedies insidiously or suddenly descends upon the unhappy family.

With the patient himself this is not always the case. The sky has long been threatening. The unhappy boy has experienced tremendous fluctuations of energy and strength, with elation of spirits on the one hand and fag, prostration, and depression on the other. Strange sensations have come over him. The abdomen of which he had never before been conscious is now a seething mass of disturbances that radiate into sensations of taste or odor, and not infrequently into those of color or sound. His mouth tastes nasty to him. The odor of his hands is distasteful and he washes them for hours at a time. He thinks he smells his own flatus and he takes medicine to dispel it, or he avoids food that he conceives produces it. At last he imagines that others notice these things and he avoids such persons and even the places where close contact with others is necessary. He may, on the other hand have similar delusions of hearing or sight. The whole world takes on a uniform color as if he wore stained glasses, and this color fluctuates or blends into other colors as do the spot lights on the stage. Any or all these symptoms may be but an episode and disappear never to return or they may herald the tragedy of adolescent insanity.

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\*Blueler, Mendelismus bei Psychosen. Schw. Arch. f. N. u. Psych. I, 19-40.

Months of relative health may separate the episodes of aberration that gradually thicken into a state of reverie, catatonia, or coma.

One of these youths was in terror of his horrible dreams in which real and fantastic characters regularly took part and he kept awake because of them, often walking until he dropped with weariness for fear he might go to sleep and dream again.

The real break is often manifest in negativism or a refusal to co-operate in the simplest matters of life. This too, may be an episode in the life of an otherwise perfectly healthy and sane individual. In the dementia praecox patient, however, it is apt, with occasional remissions, to persist. This is manifest in a refusal to eat, a refusal to speak, a refusal to get out of bed or attend to urination or defecation. The patient resists everything. He even violently resents any intrusion. He strikes when asked a question or when offered food and this act may initiate a protracted struggle.

Many patients become catatonic as an early symptom, but it has generally been preceded by a period of mental apathy or reverie. One patient who recovered said that two weeks had been passed by him in perfect unconsciousness although during that time he had made a journey of two thousand miles and conducted himself in a conventional manner so that his comrade suspected nothing out of the way.

The reactions of the patient with the mental aberrations of dementia praecox depend, of course, upon the character of the individual. One patient is violently disturbed from the first and his delusions are active and intense while another patient may be so lightly moved by his mild delusions that they only slightly modify his living habits. He may carry on his accustomed work until, at an unexpected moment, he may be completely overcome by mania or even die suddenly of the intoxication of the disease as a man dies of *delirium tremens*.

One characteristic tendency is the constant intellectual decline. The patient falls from one plane of inactivity and mental incompetency to a lower and yet a lower one as each episode of excitement and activity passes off. After any one of these episodes there may be a long resting stage of months or years in which there is a little or no change. The patient maintains a silent routine, sometimes actually speechless, doing monotonous daily tasks for a few hours each day or self-containedly sitting in the same chair unmoved by the events of the life about him. He seems to have no interest in anything he sees or hears. He smiles or laughs at his own mental reactions. He weeps or he falls into a rage with no external stimulus. He suddenly bursts forth from a crouching position of inactivity with a blow at an imaginary object on his shoulder or his ear and then lapses again into the same inactivity until the moment when the next identical outburst occurs. Thus he exists like an automaton with long periods of passiveness during which the reservoir of force is filling up succeeded by a moment of automatic activity by which it is exhausted.

It is a memorable sight to go into a ward of a hundred or more dementia praecox patients, ranging in years from boys of eighteen to men of sixty, sitting inactive in double rows around a windowless corridor, each reacting at intervals to an inner stimulus resulting in the most uncanny and often disgusting mannerisms, and to remember that each of these wrecks of humanity came from a family either now clouded by an unmentionable woe or frivolously dissipating in an effort at cruel forgetfulness.

In the adjoining dormitories these hundred patients sleep. Half of their beds are dirty and wet once or twice every night. The stench is sickening. The untrained attendants perform their disgusting and hopeless tasks as they must, and conceive a contempt for their patients that bodes no good. Raekets occasionally occur. Fights and "beatings up" are not uncommon. Almost any day may be seen black and blue spots on the patients' bodies, even around the neck. A certain few of the patients are disturbers when they burst forth into an episode of activity in which bones are broken, but this accident is not always the result of assault but often attributable to *fragilitatis ossium* which afflicts some dementia praecox patients.

The end comes in various ways. Occasionally an episode of excitement ends in the sudden death with antemortem findings analogous to those of sudden death in delirium tremens. The symptoms are those of great intracranial disturbance. Such sudden onsets in patients who had pursued a monotonous existence of irregular episodes of mild disturbance, may arouse in the attendants little interest until the patient is *in extremis*. Ordinary methods of increasing elimination (enemas, baths, normal salt intravenous injections, glucose intravenously) have no effect. Woe to the attendant if that patient has black and blue spots about the head! But at any moment before the end such a patient may turn toward recovery and appear in a few days in his accustomed place just a few steps lower in physical and mental activity.

The catatonic patient, even though a boy of sixteen, may curl up and die in his dirty bed after only a few months of tube feeding, the condition of tetany prevailing in every part of the body. His joints become stiff, he becomes emaciated and psoriasis appears over his whole body. The picture is so pitiable that the unhappy wreck is removed to a distant part of the hospital to die alone—but so long in dying! One unfortunate youth refused to die after twenty-one years of tube feeding!

#### *The Physical Condition of the Dementia Praecox Patient.*

The anthropometric examinations of patients suffering of dementia praecox have revealed no characteristics of diagnostic value. The time was when alienists looked for stigmata of mental disease as many psychiatrists now look for "twisted ideas." The time for both of these diverting occupations has, happily for rational medicine, almost gone. On coming to commitment most dementia praecox patients are underweight. The ex-

aminer will notice the reluctant handshake, the cold, cyanotic, clammy hand, and the quick withdrawal from the tardy salutation. The ordinary observer may not give significance to this phenomenon.

The patient usually has a downcast or averted attitude. The head is on the breast or averted. There is a scowl of pain on the forehead. If he is left standing he is unable to sit down and the legs sometimes tremble and the whole body is in an attitude of great distress.

If the patient is in bed he lies on his back perfectly straight and rigid, with his hands in the position of tetany. Fig. 1. The head is bent forward and upward so that it fails to rest on the pillow. Only on the rarest occasions does such a patient relax and curl up and sleep in the position that



Fig. 1—The hands of a standing dementia praecox boy in tetanic extension.

Hippocrates describes as that of health—the position so common that only the initiated notice it.

The patient's pupils are dilated and although they react to light, they do not contract with conjunctival touch. The upper lid is usually marked with large veins similar to those seen in children with whooping cough. The back of the ear and the skin over the mastoids are similarly marked. The venous turgidity may be coordinated with the cyanosis of the extremities, but the cyanosis is related to a fixed and unfluctuating edema found on the arms and legs which edema does not pit on pressure though it loses its blueness.

\*The skin of the neck, the scalp, the forehead, and the face is rich in excretions. If the patient's head is washed in hot soap suds and thoroughly

scrubbed, in half a day it will be possible to scrape great masses of sebum or other thick secretions from the back of the neck and even from the forehead and face with a dull knife.

The hair on the face in a young boy seems to disappear in patches as soon as this disease comes on. Shavings from the beard are shorter by actual measurements than those of boys who are well. If the length of these shavings from any one patient are compared at the same hour every day, any increase in the length of hairs cut off promises improvement in the psychosis. It will be noticed among the boys that the growing beard is remarkably patchy. In older men who have suffered of the disease for years there are gray hairs in the beard as well as on the scalp, but they rarely have heavy beards.

There is an enlargement of the thyroid in many patients even when infected tonsils cannot be demonstrated (without operation) and no infection of the teeth is found.

In some of the most severe cases the tongue becomes greatly enlarged and thickened. In patients who have had the disease many years the results of previous enlargement of the tongue can be seen in the outward deflection of the teeth and their consequent separation, giving the face a simian-like expression. This used to be considered one of the stigmata of mental disease.

Naturally the patient's inactivity and neglect results in dirty teeth and in little use of the jaws in mastication. This is fatal to the health of the teeth. Especially is this the case when infected tonsils are present. It is doubtful if *pyorrhea alveolaris* ever comes in a mouth behind which there are not infected tonsils.

The patellar reflexes are exaggerated, but the cremaster and plantar reflexes are abolished in most cases.

The average dementia praecox patient is so thin on first examination that the detection of pulmonary tuberculosis at that time is easy. So far the association of tuberculosis with dementia praecox in the early stage of the disease is unknown to me. The respiration in dementia praecox of the catatonic variety is often irregular, restrained, and jerky. Therefore, changes in the lungs are soon to be expected. What they actually are has not yet been demonstrated. Frequently the respiratory movements are so limited and catatonically restrained that no vesicular murmur can be detected by the stethoscope. Tuberculosis is a tardy, secondary finding, the result of declining nutrition and direct contagion from institutional life.

The young dementia praecox girls menstruate scantily, irregularly, or not at all. The semen in the dementia praecox boy is devoid of living spermatozoa. The ovaries and testicles become smaller during the progress of the disease (Todde).

There is a peculiar hairiness of the lower legs in many dementia praecox boys and later the legs below the knees will be found strikingly small, though the thighs are normally developed.

Occasionally a remarkable atonicity will be noticed in the sphincters of the rectum; and those of the vagina resembling the findings in the aged, but this is contrary to the more general spasmophilic condition.

Most dementia præcox patients are notably constipated. They go many days without movement of the bowels, though they have the urging and pass hours in vain waiting on the stool. They often seem obstinately to abstain from bowel movements until put in a clean bed or are dressed for a walk.

When given the barium meal it is generally discharged from the stomach in a perfectly normal manner within the four-hour limit. The small intestines of these patients are also competent and muscularly perfectly normal as far as the ileo-cecal valve. This valve is generally com-

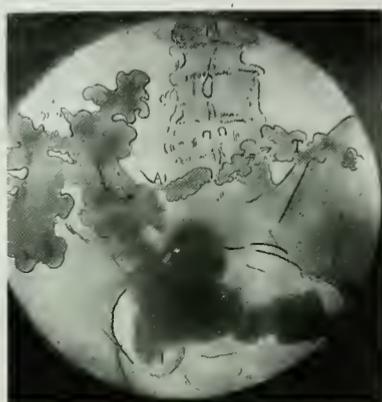


Fig. 2—The barium meal in the cecum beginning to pass the valve of Cannon, A into the transverse colon T. The second barium meal is in the small intestine I.

petent and perfect in its action and permits no delay or regurgitation. There is no stenosis or incompetency. The cecum, on the other hand, however active it may be in its anti-peristalsis, is unable to pass on the greatly dehydrated meal. This is not due to lack of muscular function in the cecum, but to a spasm of the sphincter of Cannon and reduplication of the gut in front of the sphincter.

Twelve to twenty-four hours after the test meal is given this sphincter can generally be seen either by the fluoroscope or by a happily arranged photograph. Fig. 2. A. The sphincter is apparently two centimeters long and when the cecum is squeezed hard enough to force a bacillus of the opaque meal through into the transverse colon, it seems to be less than half a centimeter in diameter as viewed by the fluoroscope. In a series of more than twenty patients the cecal retardation has extended from fifty-four hours to seven weeks! The transverse colon generally is active and empty, or filled with gas. After appendicostomy has been performed it is possible

to determine the conditions under which the sphincter of Cannon will relax and allow the contents of the cecum to escape into the transverse colon. A manometer six feet high was attached by a T to the catheter passed into the appendicostomy opening, the patient sitting on the stool. The cecum began to fill when the manometer stood at six inches of water. When 600 c.c. had passed into the cecum the water in the manometer rose to fifty-five inches and then rapidly fell as the water rushed through the sphincter of Cannon into the transverse colon. This happened several times before the water began to pass out at the anus. The pressure necessary to overcome the contraction of the sphincter of Cannon seems to be between fifty-four and thirty-three inches of water. If the water is very hot, 110° F., the

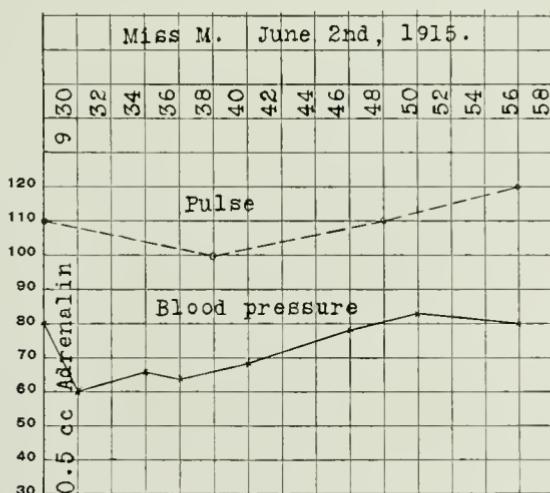


Fig. 3—Miss M. June 2, 1915, after intra-muscular injection of 0.5 cc of Adrenalin (P. D. & Co.'s 1 to 1,000).

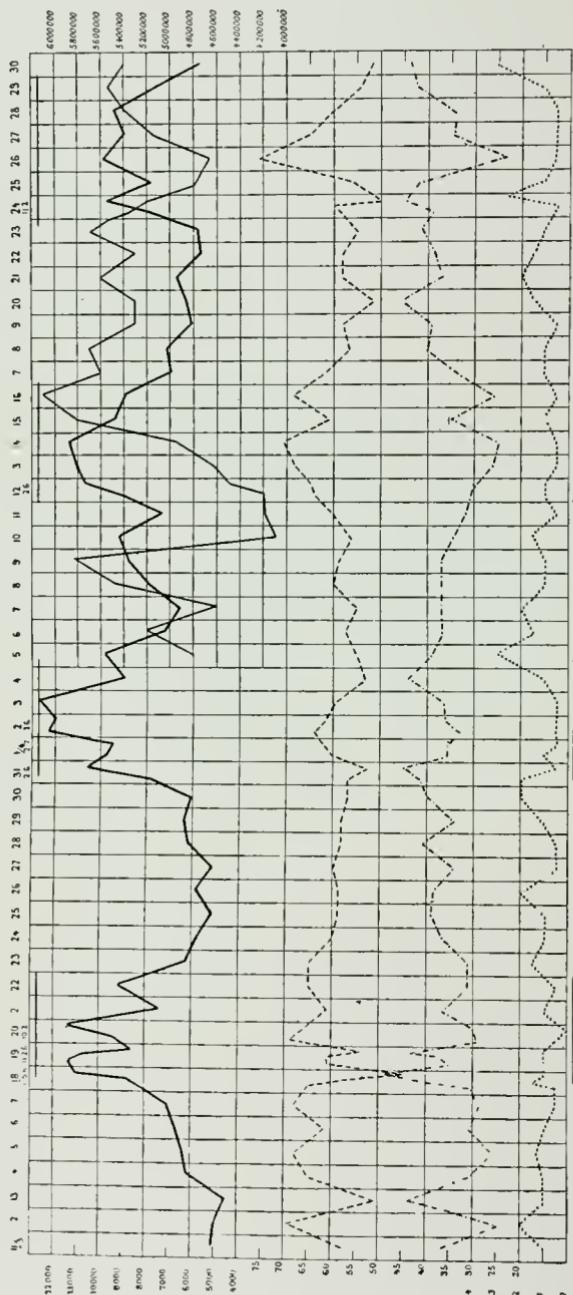
second and subsequent fillings of the cecum do not require so great a pressure to overcome the spasm of the sphincter as the first filling did.

The finger nails and the toe nails of these patients in the early stage of the disease generally show transverse ridges more conspicuous on the four halluces which seem to indicate periods of low nutrition. Sometimes these ridges or grooves can be coordinated with the history of distinct exacerbations of the disease or with acute episodes.

The blood pressure in dementia praecox is usually low, 100 mm. of mercury or less. The remarkable fact that 0.5 cc. of adrenalin (P. D. & Co.'s 1-1,000 sol.) does not raise this low pressure, but generally depresses it, is of great diagnostic value. The pulse and temperature are normal. Fig. 3.

The number of red corpuscles is generally high, 6,000,000 to 8,000,000, and yet there is a diminished number of white corpusles. In health the

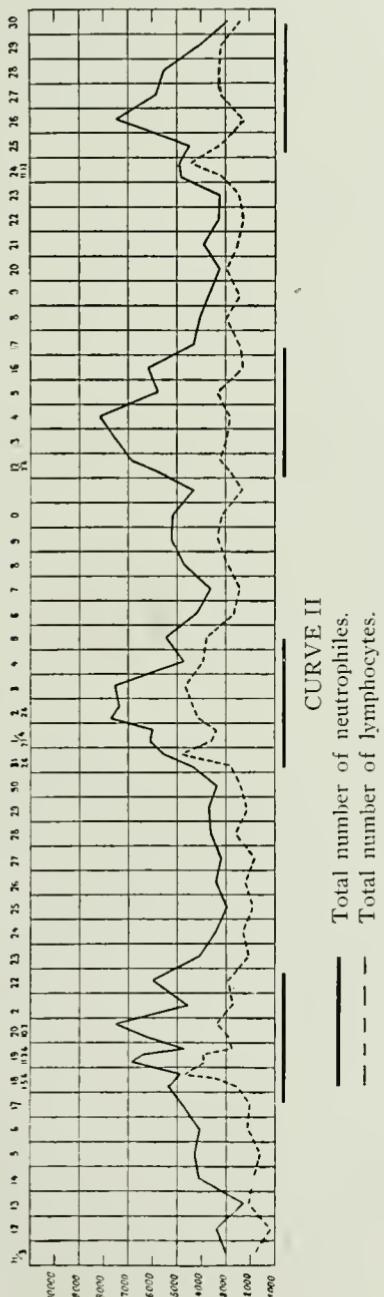
These graphs show the fluctuation of red and white corpuscles and the periods of improvement marked by a line at the bottom of the chart. See curves I and II.



CURVE I

- Total number of white blood corpuscles.
- Total number of red blood corpuscles.
- - Percentage of neutrophile leucocytes.
- - - Percentage of lymphocytes.
- ..... Percentage of eosinophiles.

Horizontal line above and below the curve shows disturbed periods



temperature is 98.6° F., the pulse 72 to 82 per minute, the red corpuscles 5,000,000 and the white corpuscles 8,000 per ccm. of blood. Fig. 4. (Kahlmeter.) The viscosity of the blood serum and the blood itself is abnormally high. The fluctuations are remarkably rapid in dementia praecox and as the blood approaches the normal the patient's condition, measured by the mental symptoms, correspondingly improves. Coagulability of the blood is greatly increased, as a rule. The hemoglobin index is often very high, and in a few cases methemoglobin and sulphhemoglobin have been recognized by the spectroscope.

We have as yet no knowledge as to the calcium, the sulphur, and amino acids in the blood of our patients. These are points demanding early elucidation.

The defensive ferments in the blood of dementia praecox patients are abnormal, numerous and diagnostic. They are indicative of a catabolism of the cerebral cortex, the sex glands, and some of the other ductless glands of the body. The dialysing method of recognizing these ferments originally proposed by Abderhalden and first practiced by Fauser is one of the objective diagnostic tests of dementia praecox. It seems likely that it has more to offer than a simply yes or no diagnosis. It shows what localities of the body are being destroyed by the disease. This method is only one of many methods designed to show changes in fluids after the breaking down of large molecules by the unlocking action of enzymes. The optical and the mios-tagmin methods are only less delicate.\*

The spinal fluid in dementia praecox is under extremely great pressure. Normally the intra-cranial and intra-spinal pressure, when measured by

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\*We are accustomed to consider the liver as differing from the kidneys in histologic morphology and in gross anatomy only. This superficial and obvious view is inadequate. They differ also in the protein molecules of which the histologic structures are built up. This difference is observed in the molecules of which each and every organ of the body is constructed. It is this difference on which the varying functions of different parts of the brain are most likely to depend. The only manner in which these molecules can be individualized is by the defensive ferments. These enzymes may be compared to the keys of a series of locks, and they are produced in the blood or at least they appear in the blood whenever any detached molecules must be excreted from the body. If, for example, an infarct appears in the liver, liver cells composed of peculiar protein molecules found only in the liver must be removed from the body. These molecules are too large to be excreted. Each must be disarticulated before it can be excreted.

By a process which cannot yet be explained, the "specific enzyme" or defensive ferment, or, if we carry the simile farther, the key which will unlock the molecule and this molecule only, is developed in the intoxicated or poisoned body. It acts without exhaustion, saturation, or being used up, upon the liver cell molecules only one after another until the refuse of the infarct is completely removed and the body detoxicated. These enzymes have the power of acting identically on the liver molecules outside the body in a test tube as well as in the body. The liver protein molecule is broken up into smaller pieces, known as amino acids, peptones and poly-peptides. We know they are smaller because they pass through a collodion membrane or dialyser and can be recognized. The process is relatively simple and is fully described in Abderhalden's book on the defensive ferments which has been translated into English. The greatest source of error is in the imperfection of the dialyser, but they can be made perfect by a careful technologist.

lumbar puncture with the patient on his side, is equal to 60 to 125 mm. of water or spinal fluid. The intra-spinal pressure in fifteen dementia praecox patients was 155 to 360 mm. of water. Some of these patients had repeated punctures made and none of these varied much from the original reading. One patient was given an intra-venous injection of glucose and for less than twenty-four hours the intra-spinal pressure fell to 40 mm. of water. One patient who seemed to have recovered completely after appendicostomy still had a high intra-spinal pressure, 160 mm. of water two months after his discharge. It is possible that the intra-ventricular and the intra-spinal pressures are not the same, any more than the chemical and physical conditions of the spinal and the ventricular fluids are identical. There are many reasons for suspecting that the intra-cranial pressure in dementia is far above normal. This is in sharp contrast to the low blood pressure of these same patients. In only two of my patients the spinal punctures showed an abnormally low intra-spinal pressure, though the dilated pupils, the enlarged veins in the upper lids, the enlarged veins in the fundus and behind the ear spoke for high intra-cranial pressure. In these two patients, one with a spinal pressure of 40 mm. of water and the other 60 mm. of water, there was no fluctuation of the column on struggling or on breathing. It seems possible that the spinal pressure and the intra-cranial pressure were not the same.

The spinal fluid in dementia praecox has not been adequately studied in my laboratory. The cell count is normal. The Lange goldsol reaction was found by Paul Weston to be confined to the first two tubes. The hydrogen ion concentration was studied by Levinson in Tashiro's laboratory without significant result, and even the careful cholesterol estimations of Paul Weston show only one fact and that is that the spinal fluid in dementia praecox is abnormal, and these patients are sick.

The urine in dementia praecox has never shown any uniform or striking abnormalities of great diagnostic or etiologic significance. It is more toxic than normal urine in some conditions, but the urotoxic index, once so popular, is an unreliable and so far useless presumption. The greatest fluctuations are met with; in one instance the urine has a specific gravity below water, in another it is 1.035. There are enough evidences of abnormal metabolism in the urine, but they are not constant. Albuminuria and glycosuria are rare and symptomatic of explicable accidents, while polyuria and urine charged with the products of catabolized amino acids are far more common and consistent with the disease. The breakdown of tryptophane, for example, appears as indolacetic acid if accomplished in the tissues of the body but as indican if the result of bacterial action in the intestinal tract. In the former instance the indolacetic acid is said to be *endogenous*, in the latter the indican is said to be *exogenous*. About twenty per cent of healthy people have products of the endogenous catabolism of tryptophane in the urine, while nearly all dementia praecox patients have products of

both endogenous and exogenous catabolism of tryptophane in their urine, and both in excessive quantities.

It is not easy to recognize the catabolized products of tyrosine, histidine, prolin, and the diamino acids in the urine, but cystin has not been observed in pathologic quantities, though easily found. It is a fact that non-oxydized sulphur in abnormal quantities is found in the urine of nearly all dementia praecox patients, both in the acute and excited, the chronic and inactive. In acute cases there is increased excretion of nitrogen and phosphorus, but in chronic and inactive cases with retarded oxygenation there is diminution of nitrogen and phosphorus. In all conditions and in nearly all patients there is a continuous, but not uniform, increase in the excretion of sulphur and calcium. The fluctuations in the quantity of urine, the quantities of calcium and sulphur and phosphorus have led some clinicians to look for derangements in the glands of internal secretion. This may be coordinated with the defensive ferment reactions, with frequency of enlarged thyroids and with the absence of spermatozoa in the testicles.

Urea formation in dementia praecox ought to be easily and satisfactorily studied, but unfortunately it has not yet been done on an adequate scale. One would premise in the inactive a low urea excretion which in a few cases at least has not been realized. This outline shows some few points in which progress has been made into the survey of the disease which ought to be carried out by extensive synchronous research. It has been forced upon me as a conviction that in a condition so desperate, treatment should be begun even before absolute scientific demonstration of a theory could be reached.

Appendicostomy seemed to me indicated and was performed on nine of the patients with cecal stasis, and only one (Madaus) has failed to make satisfactory improvement or complete recovery.

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It is of the first importance, both to the work itself and to the political democracy that we represent, that we do not think of research primarily in terms of organization.

*L. H. Bailey.*

## NOTES FROM THE HISTORIES OF RECOVERED PATIENTS.\*

During the nine months our laboratory has been open and active, thirty patients have been received into the research ward of nine beds. Some of the patients have remained only a few days. It was soon discovered that ten were not suffering of dementia praecox at all or what was equally important, it was found impossible to get permission of parents or guardians to do such experimental operations as the investigations we had fixed upon made necessary and, therefore, they were discharged. This left twenty patients who submitted to our studies and to such treatment as seemed to be indicated from a consideration of the findings and our theory of the disease. To make the disposition of these thirty patients clear, they may be scheduled in five groups and we will consider the recovered patients in this portion of our report in full.

Patients admitted to research ward April 1, 1917, to Jan. 1, 1918.. . . . .	30
Patients discharged at request of parents, etc..... . . . . .	10
Patients committed to state hospitals at our request..... . . . . .	3
Patients discharged recovered or greatly improved. . . . .	10
Patients remaining in ward Jan. 1, 1918. . . . .	7

Fragmentary examinations were made on other patients for purpose of control and their names will be found in the reports and might lead to statistical confusion unless this fact is borne in mind.

The recovered dementia praecox patients submitted after diagnostic examinations had been made to a series of three methods of treatment.

(1) *The Medical Treatment.* This consisted in the administration of calcium lactate, ten grains three times a day at meals and various laxatives, especially compound cathartic pills and blue mass pills. It had been our purpose to try the Towns-Lambert de-toxicating treatment which has proved so miraculously effective in drug habitues, but our lack of a resident physician has prevented. Medical treatment alone has generally been continued two or three months. None recovered, but one was discharged greatly improved. (Hiti.)

(2) *Intravenous Saline Injections.* This specific or empirical method of Ishida† has been used on twenty different patients, eighteen of whom had been diagnosed dementia praecox patients. Two patients recovered, namely, James Cankar and Clement Balinski.

(3) *Appendicostomy and irrigation of the cecum and colon five hours after the last meal of the day.* This treatment was undertaken only after the demonstration of a cecal stasis of three or more days by the fluoroscopic

\*From the Research Laboratory of the Psychopathic Hospital, Cook County Hospital, Chicago. Bayard Holmes, M. D., Director; Julius Retinger, Ph. D., Bio-chemist; Harry M. Jones, Ph. D., Bacteriologist; Walter Ford, M. D., Psychiatrist; H. C. Stevens, Ph. D., M. D., Psychologist; James Henderson, Blood Morphologist; Paul Headland, Clinical Assistant; Leola Sexton, A. B., Entertainment and Re-education.

†Ishida, N. Am. Jour. Insan., 1917. v. xxiii, 541-547.

observation of the progress of two or more barium test meals. Eight patients have recovered or so far improved, that they are discharged.

At this time we present the histories of the two patients successfully treated by the intravenous injection of normal salt solution. (Ishida.)

#### NOTES FROM THE HISTORY OF JAMES CANKAR.

James Cankar was admitted to the Psychopathic Hospital with the No. 49088 on March 3, 1917. The patient was wearing the uniform of a private in the United States Army. When first examined he was in bed. He stared straight ahead with dilated pupils. He answered questions very tardily, very briefly, and in a very uncomprehending and unsatisfactory manner. He was in a condition of *cerea flexibilitatis*, and was distinctly spasmophilic. He tires easily and will not answer questions after a few minutes of questioning. The veins in the upper lids and behind the ears are enlarged as they are in children with whooping cough. The skin of the scalp and neck is covered with a rich secretion of sebum. The beard is patchy and there are patches of blush that change frequently. His hands and feet are frequently cyanotic. He refuses to eat, even to swallow, and tube-feeding was necessary for several weeks.

On May 12th he was noted as quiet in bed, with his hands folded over his chest, and looking fixedly at the ceiling. He answered questions in monosyllables without looking at the examiner. *Cerea flexibilitatis* is not quite so marked. He shows very little negativism and when told to put his arms down, will hardly do so. He knows he is sick in a hospital.

He had been admitted to the Chicago State Hospital at Dunning, August 6, 1914, at the age of 19, and was discharged one year and three days later.

On admission to the Psychopathic Hospital he was catatonic and resisted feeding. He was nearly mute, but occasionally could be induced to answer questions in monosyllables. His condition is well represented in the two photographs made by Dr. Horry M. Jones, Fig. 1 and 2.

His complete anamnesis was written by Dr. Walter A. Ford on April 9th, from information given by his brother, Otto Cankar, No. 2107, 48th Court, Cicero, Illinois. This history is very erroneous, but it is abstracted in order to show the mental condition of Otto himself, who later came into the hospital as a patient under the name of Adolph Cankar.

James Cankar's father, Ignatz Cankar, was born in Bohemia in 1848 or 1850, died about 1899, but the cause of his death is not known. Otto says the father did not drink much, and there is no insanity that he is aware of.

James Cankar's mother, Anna Cankar, was born in Austria, died in 1905 of dropsy and heart disease.

There are four boys and two girls in the family.

James, Otto says, is the only one insane. All of the children are living and well. No tuberculosis, cancer, etc., in the family.

The patient, James Cankar, is the youngest in the family. He was born in Chicago in the year 1895. He seemed to be normal as a child. He went to school five or six years and advanced as far as the fifth or sixth grade. He quit school to go to work after his mother died in 1905. The informant does not remember what the patient worked at when he first went to work.

For two years before his first attack, which was in August, 1914, he worked in a perfume factory, putting up liquid and powder perfume, Otto says. He earned about \$12.00 a week. He started at this place at the age



Fig. 1, James Cankar, April 15, 1917.

of about 17 and worked two years. He was always quiet and not especially sociable.

The previous attack: First noticed that patient talked a little out of his head. This was after he left the perfume factory. He went to work on River boats, helping to load them. It was while engaged in this work that he became insane. He got to drinking and smoking, and this, Otto thinks, made him crazy.

He was admitted to the Psychopathic Hospital the first time in 1914, and was sent to Dunning. He was in Dunning about  $3\frac{1}{2}$  months and family took him home and he has been all right.

About six months ago he joined the army and went to Texas. In January he came back and seemed all right at that time. He was mustered out of the service in January. He stayed with another brother for about

two weeks, and then he joined the army here. This last attack was quite sudden. He started being lazy and talking to himself. Although subject to call for the army, he enlisted again and his brother does not know whether he enlisted under another name or not. He was brought back to the city (brother does not know where he was) by two soldiers and taken to the Psychopathic Hospital. He had been in the army the last time about 2½ months. For all the informant knows, he might have just wandered around for a while. He got back to the army, however, before being brought here, where he was admitted wearing the uniform.

The informant is hard to question. He knows comparatively little about his family and has not kept track of his brother very carefully the last few years.

#### ANOTHER AND MORE RELIABLE ANAMNESIS.

The following information was given by Mrs. Anna Reinhold, 2965 Cottage Grove Avenue, a sister of the patient. Mrs. Reinhold states that



Fig. 2, James Cankar, April 15, 1917.

she wished to give the following information as a possible help in the treatment of the case.

The father, Ignatz Cankar, committed suicide at the age of 54 by hanging. He had tried to kill himself at the age of 42 by drowning.

Not much is known about Ignatz Cankar's father and mother. Informant thinks there were suicides in the family and father did not want to mention them. There were nine children of Ignatz Cankar, three girls and six boys. The informant and four boys are living. One girl died of suicide three weeks after she had given birth to a child. She was then twenty-six years old. Two boys and one girl died in infancy. The informant herself was a patient in Dunning seven years ago following the accidental death of her daughter. She states that the shock of her daughter's death started her insanity. She became almost mute and was very religious. The mother of James Cankar was mentally well and her family shows no

traces of insanity. Her brother, James Cankar's uncle, died of consumption. One brother of the patient is very emaciated and is probably tuberculous. The eldest brother is strong and well, but is inclined to be either morose or just the opposite. He is separated from his wife. Informant thinks the wife could not stand his disposition.

James Cankar, our patient, seemed to be all right as a child, and up to the age of fifteen or sixteen years. He began to smoke cigarettes at the age of sixteen years. He had always been delicate and was frail up to the age of twenty years, after he got over the first attack. He had always been bright up to this age and then he began to be duller mentally and was noticed to tell lies. At least the informant believes that his mental trouble lead to an inability to tell the truth.

After the age of sixteen he got periods when he would go away from home and stay for months. On his return he would be ragged and dirty. He would work for awhile and then run away again.

Just before coming to the Psychopathic Hospital the first time in 1914, he got to talking all the time about a man named Spencer, whose name was in the papers in connection with several murders. One day he went to a printing shop where he had worked several months before and started sweeping floor. He was noticed by the proprietor and taken to this hospital.

He joined the National Guard two years ago and was mustered out. Just before the present attack he beat his way to Texas and enlisted again and stated he had never been in the army before. This was about February, 1917. He was in a hospital in San Antonio for a while and was then sent home.

*The information from Dr. Geo. Leininger of the Chicago State Hospital.*

Replying to your request for a history in the case of James Cankar would say that he was admitted to this institution August 6, 1914, and was discharged August 9, 1915. At the time of admission he was nineteen years of age.

The family history shows that the father was insane and committed suicide at the age of fifty. In the patient's family there were nine children, one of whom committed suicide; one was insane and a patient in this hospital at one time. Otherwise, the family history is negative so far as is known.

The patient started to school at the age of nine and received two years in high school, fairly good progress being reported. After leaving school he learned the printer's trade and has since followed this line of work with reasonable success. There seems to have been no physical illness which would have a distinct bearing on the psychosis.

Six months prior to admission the patient had a prolonged attack of articular rheumatism and was confined to his bed for three months. He was always regarded as a bright, cheerful and active child. The first mental symptoms were noted in July, 1914. At that time there was a murder

trial going on in Chicago, and the patient having read a great deal about this, voiced his first delusional ideas along this line. He thought he was going to save the man from the gallows and he talked a great deal about this one idea. He told his foreman at the printing shop of his plans and he realized that the patient was delusional, called in the police and sent him to the Psychopathic Hospital. From there he was committed to this hospital.

At the time of admission the patient was quiet and orderly in his conduct, kempt in his personal appearance and adapted himself well to the ward routine. He stated that he was well satisfied here and that he desired to remain here forever.

Physical examination revealed a poor state of nutrition, teeth poor and a marked systolic murmur at the apex was noted. There were no distinct neurological findings at that time. Mental examination revealed a rather broken and incoherent manner of speaking and some very delusional ideas. He thought that God was talking to him. He stated that he could hear all kinds of people talking to him, but did not go into detail regarding his hallucinations. He was well oriented and there were no gross defects in memory. He was unable to do simple tests in history, geography or mathematics.

A diagnosis of hebephrenic dementia praecox was made in view of the type of his conversation, his delusional ideas, and his irrelevancy of speech. He was discharged, as stated above, and we have since heard nothing from him.

On May 14, 1917, Dr. Walter Ford made a physical examination in the ward. During the morning he had refused to stay out of bed, he removed the clothes that had been put on him and got into bed the moment the attendant was out of sight. He was in bed when the examination was ordered, and had to be brought from his bed to the examining room undressed. When told to do so, however, he got up on the examining table and laid down on his back with his hands folded over his chest in much the same stiff attitude in which he slept. He co-operated somewhat in the physical examination, but in a passive way, offering no resistance, and doing slowly what he was told to do. He made no observation or remark except to intimate that he wanted to go to bed. He said several times during the examination, "will you let me go to bed now."

The boy is five feet four inches tall and weighs eight-six pounds, he has a fair complexion with brown hair and blue eyes. His general state of nutrition is below normal. There are no malformations and no evidences of rheumatism in any of the joints. There is no enlargement of the thyroid and there are no eruptions on the skin.

On palpation and percussion and oscultation the chest appears to be perfectly normal and free from any evidences of tuberculosis.

The blood pressure is 116. There is no evidence of arteritis. The

apex of the heart is in the fifth interspace, three and a half inches to the right of mid line. There are no murmurs, no irregularities of the heart, and no abnormal accentuations. The pulse is full, soft and regular, 80 per minute. If anything, the heart is slightly enlarged, both to the left and right.

The mouth is not in very good condition. The teeth need attention, especially about the gums. One tooth on the left side is missing and two are very much decayed, and one other is starting to decay. There is a pyorrhea alveolaris.

The fauces are slightly inflamed, possibly due in a measure to tube-feeding. The tongue is clean, but there is evidence of a moderate, chronic tonsilitis.

The abdomen is tympanitic and it is difficult to palpate, because the patient holds himself in such a rigid condition. He is catatonic and exhibits *cereas flexibilitatis*.

The bowels are said to be constipated. It is impossible to palpate the spleen because of abdominal rigidity, though the patient complains of no pain on palpation or pressure.

There is no history or evidence of venereal disease of any kind, and the sexual apparatus is without scar and normal.

When patient is on his feet he walks with a slow, but normal gait, and there is no evidence in his movements or attitude to indicate any sort of paralysis. When the tongue is protruded there is a slight tremor which is persistent and the same is observed in the closed eyelid. The veins of the upper lids are obviously enlarged and resemble those of children in the later weeks of whooping cough. The patient does not exhibit any muscular negativism.

The patient has never worn glasses. His conjunctiva is not congested. The pupils are enlarged, but they react to light and accommodation. The touch of the sclera does not cause the pupil to contract. The instillation of adrenalin into the conjunctival sac produced an increased dilatation of the pupil within an hour.

The superficial and deep reflexes of the body are present and normal, except that the knee jerk appears to be rather brisk. There is no Babinski.

A careful search discovers no anesthesia, paresthesia, painful or conscious spots, and there is no dizziness or Romberg phenomena. The patient walks well in a straight line and co-ordinates the touch of the fingers to each other and to various parts of the body.

When first admitted to the hospital the patient showed marked catatonic features. He stood and looked straight ahead and appeared to notice no one and nothing. He was brought to the hospital wearing the uniform of a private in the United States Infantry and was in the charge of another soldier.

When put to bed he laid on his back with arms folded on his chest

and answered only in monosyllables, and not all the time. On one occasion when his bed was made he was allowed to get back into bed unattended. He laid with his head about six inches above the pillow in a very awkward attitude. (See Fig. 1.) He maintained any attitude in which he was placed and voluntarily assumed such attitudes as Fig. 2.

On May 17 the patient was unwilling to come up to the examining room on the fifth floor. He did not respond very quickly when asked to follow the physician. There was a positive negativism. On being brought to the examining room he kept getting up out of his chair while being examined, and edging off toward the door. On one of these occasions he was asked if he wanted to go to the toilet, and he indicated that he did. If asked if he wanted to go to bed, he answered in the affirmative. If asked if he was sleepy, he said he was.

It was impossible to get him to co-operate and make the mental tests.

On May 15th he was given a barium meal at five o'clock in the morning, at ten o'clock he was taken to the x-ray room and examined fluoroscopically. The meal had passed entirely out of the stomach and appeared to be all confined to the cecum. A little had passed through the sphincter of Cannon into the transverse colon. A second barium meal was given at this time, and the configuration of the stomach, the pylorus and the duodenum, shown to be normal, with normal peristalsis. On the 18th the meal was still found in the cecum with considerable portions scattered through transverse descending colon and sigmoid. This shows that there was a cecal and a colonie retardation of at least seventy-two hours.

On May 17th blood was taken for the Abderhalden reactions which were made by Dr. Julius Retinger. The cortical sensory centers, the pituitary, the infundibulum gave positive reactions; the latter two the stronger, but the medulla, the pons, the dentate, the basilar nucleus, the cerebellum, the dura, the auditory, speech, motor and frontal association centers were negative. The parathyroid, the thyroid, the testicle, the gall-bladder and the ileum were positive. The first two the stronger, but the adrenals, the liver, the spleen, the kidney, the appendix vermiformis, and the control were all negative.

The cerebro-spinal fluid and the blood serum, both gave negative Wassermanns. The Goldsol test showed some disturbance in the second, third, fourth, fifth and sixth tubes. (See Fig. 3, 1.) These examinations were made from a spinal puncture on July 2, and on blood serum on May 22.

James Caukar's blood was highly concentrated with a rather marked leucocytosis. In the examination of May 10th the Sahli was 93, the red blood corpuscles numbered 6,696,000, the white blood corpuscles 16,660. The Widal was negative. There were 55 per cent cells by volume. There were no malarial organisms. The Arneth count showed in the five major classes the following in 100 white corpuscles: 5, 34, 51, 10 and 0. There

were 25 small monos, two large monos, 71 polyneutrophiles, 1 eosinophiles, 1 basophiles per 100. The reds appeared normal in every particular, while the leucoeytes were of a poor quality. This count is a sample of many made during the month of May, and gives the fair picture of the blood.

On June 6th a quantitative estimation of the number of living bacteria per gram of stool was made, and the reaction of the stool tested. The stool was placed in a colloid dializer and dialised against distilled water. The dialisate showed a reaction of pH = 7.2, i. e., slightly alkaline. The number of living bacteria per gram of stool was found to be approximately 200,000,000. These were mostly of the *B. coli* type. This was done before we were able to recognize the *B. aminophilus intestinalis* type, and, therefore, the latter may have been overlooked.

On June 26th, when the boy was considerably improved, his heart was examined by Dr. Bayard Holmes, Jr., the pulse was 82 at the time, the blood pressure 142-78, there were no murmurs, no accents. The apex beat

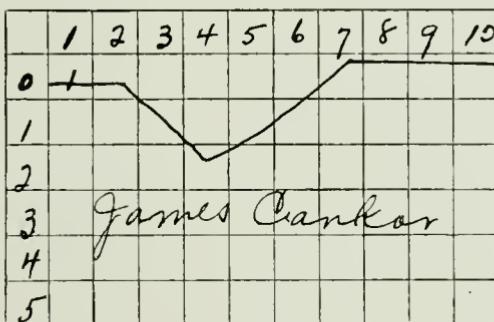


Fig. 3, The Goldsol Curve of James Cankar.

was 3½ inches from the mid-line, the upper area of dulness under the third rib, the lower under the sixth rib. The mitral and aortic tones were normal, and there was no evidence of an old endocarditis.

On June 28th an examination of another sample of stool was made for any types which could be grown in histidine medium, either anaerobically or aerobically. The examination of these cultures is still in progress, having been delayed for lack of supplies for making histidine medium.

The examination on the Yerkes-Bridges Point Scale resulted in 44 erredits, mental age 8 — plus, Coefficient I. A. 44/88.3. This test was made by Dr. H. C. Stevens on May 10, and May 15. A few days later the Rossolimo tests were made and are exhibited in the curves to be found in Dr. H. C. Stevens' article in this number on another page.

On May 21, 1917, the normal salt injections were begun and continued during the following week. Before the injection of the solution it was sterilized, rapidly cooled, and given in perfectly sterilized pereolator apparatus.

The patient was at this time confused and very restive. He was with difficulty persuaded to get on top of the operating table, and kept there by constant and repeated coaxing. He had resisted when his coat was removed, saying he wanted to go back down stairs.

Five hundred cc. of a recently sterilized and rapidly cooled normal salt solution was allowed to run by gravity into a vein at the right elbow. The patient resisted considerably during the treatment. His temperature at the beginning was 97.8—by axilla. His blood pressure was 165; his pulse was 96 per minute after 500 cc. had run into the vein, and his blood pressure was 175 mm. of mercury. He still continued to resist, but appeared brighter and insisted that he was all right now. Immediately after the injection the patient asked to go to the toilet; this was allowed, and his bowels moved quite freely with a liquid movement. The examiner considers that the blood pressure was not to be relied upon, as the patient was struggling most of the time.

On May 23 the patient played a game of rummy with Joe Sehraw, one of the patients. He took little interest in the game, however, and finally laid down the cards and quit. He was taken to the examining room soon afterwards, and when he was asked to get up on the table, insisted on removing all his clothes before he did so, although a nurse who assisted on the intravenous injection was present behind the screen.

The patient was given approximately 900 cc. of a normal salt solution with much less difficulty than before. His temperature by mouth was 98.6 and his blood pressure was again 165, but the physician remarks that he does not consider it reliable. That time he did not make so much disturbance and did not refuse to lie still on the table. He continually asked to go down to his room and insisted upon slowly contracting the muscles of his arm and he held his head up from the pillow. The infusion took nearly three-quarters of an hour.

After the injection the patient got up and insisted upon going to the toilet, where he passed 100 cc. of clear, colorless urine. The patient seemed a little brighter and talked and laughed a little. Very soon afterwards, however, he again seriously inquired about going down stairs.

His blood pressure was not raised and his pulse was only a few beats more rapid.

Three other injections of a 1,000 cc. were given on the following days, and on June 7th, after a protracted bath and an enema, he appeared in fine condition. On entering the ward on June 8th he was found talking with some of the other patients and seemed remarkably improved in every way, he came forward and shook hands and asked to be allowed to return to his company, which he said was at San Antonio, Texas. It seemed impossible that so much improvement could take place in a few hours. He came into the examining room and had his pictures taken (Fig. 4 and 5). He says now in the most rational and animated manner, that he was struck

over the head by a Mexican when he was guarding a bridge near San Antonio; it was eleven o'clock at night and he did not see the fellow stealing upon him, until he was knocked unconscious. He says he did not come to his right senses until two weeks afterwards in a San Antonio hospital. He was then given two weeks vacation and came home on the train, having plenty to eat and a pleasant time. He was home only one day when he was brought to the hospital. He said he drank more than he ought to.

It does not appear that this is in accordance with the facts.

In examining him it is noticed that wherever his uniform fits his neck or chin there are great blotches of hives. After stripping him and examining the skin it is noticed that there are many hives over various parts of his body, especially under the belt and where he leaned against the back of



Figs. 4 and 5, James Cankar as He Appeared When Discharged.

a chair. It is easy to produce hives by scratching the skin with the back of the nail.

From this time on James Cankar improved every day in a most remarkable manner. He was given a few more normal salt injections and seemed to be benefited almost immediately by each one of them. He became very helpful about the ward and assisted the attendants in making the beds and in giving the baths to other patients.

On June 26th he was in such fine condition that he was allowed to go home for a week. On his return he was discharged from the hospital and immediately went to work with the Hartford Electric Company on

Jackson boulevard. He continued at his job without any loss of time or without any accident until December 5, 1917, when I called to see him at the factory one morning and he consented to come to the meeting of the Chicago Medical Society that evening. He also agreed to bring another one of the recovered boys with him and did so. He was in splendid condition and showed none of the symptoms of dementia praecox which he had previously manifested.

Late in December he received his questionnaire, and went to the recruiting station and enlisted in aviation, for which he passed all the preliminary examinations.

(Report to be continued.)

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We may, therefore, well hope that many excellent and useful matters are yet treasured up in the bosom of nature, bearing no relation or analogy to our actual discoveries, but out of the common track of our imagination, and still undiscovered, and which will doubtless be brought to light in the course and lapse of years, as the others have been before them; but in the way we now point out, they may rapidly and at once be both represented and anticipated.

*Francis Bacon.*

# Dementia Praecox Studies

VOL. I

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No. 2

## CONDENSED NOTES ON HISTORY OF FIVE OF FIFTEEN CASES OF DEMENTIA PRAECOX TREATED BY ISOTONIC SALT SOLUTION, ADMINISTERED INTRAVENOUSLY OR BY HYPODERMOCLYSIS AT THE HUNTINGTON STATE HOSPITAL, DURING THE YEAR 1917

By L. V. GUTHRIE, M. D.

### CASE I

Ernie McKee, female, aged eighteen. Dementia praecox ( hebephrenia), stupor, mutism, unclean, etc. Date of commitment, August 3, 1916. Was insane previous to commitment, four months. Was a patient at this institution nine months before this treatment was administered. During this period of thirteen months there has been no improvement in patient's condition. Was discharged May 18, 1917.

The infusion was given as follows: 500 cc., 100 cc., 1,000 cc.

*Results:* After first infusion patient was not so stupid but talked little—has improved in cleanliness and habits and is more easily managed. After second infusion, smile and expression not so much demented and is beginning to wait on herself and do little, odd chores about the ward. One week after third infusion, patient much improved and for the first time expressed desire to go home—said that she knew she had acted foolishly—now is almost normal in manner and conversation. A week later she was removed from the institution and when last heard from was visiting relatives and apparently normal to all outward appearances. Patient's physical condition had also greatly improved when she left the institution and, I am informed, that she continues in good health.

### CASE III

Nora Hopkins, female, aged twenty. Dementia praecox (catatonia), stupor, mutism, patient has been sitting in a chair most of the time during the day for the past year. Date of commitment, August 15, 1916. Was a patient at this institution ten months before this treatment was administered. There were no periods of improvement in the patient's mental con-

dition during those ten months previous to treatment. Was discharged October 21, 1917.

The infusion was given as follows: 400 cc., 700 cc., 600 cc., 800 cc., 800 cc.

*Results:* The next few days after the first infusion no marked change noticed in patient's mental or physical condition but on the sixth day the assistant physician inquired of her as to how she felt. She replied promptly that she was feeling much better and smiled for the first time since admission. After second infusion patient seems much better, talks freely when spoken to and is frequently found busy working around the ward—asked the physician not to put the needle in her again as it pained (during the first and second infusion patient remained on operating table in a stupor during the operation and had apparently not felt the needle). After third infusion patient writes a well-worded and intelligent letter to her husband, the first time she had written since her admission here, and asked him to have her removed from the institution on parole. On following day, patient writes a letter to her mother. Patient at this time seems greatly improved and almost normal, with the exception of a silly smile when joked with. After fourth infusion patient smiles naturally and continues to improve. Asked the physician to find out where her husband was located, as her letter had been returned. Patient wants to go home—said she knew she had been a "regular devil," that she had climbed the window guards, disrobed, and was extremely sorry she had put the attendants to so much trouble, but that she could not resist her feelings at the time. This patient is apparently normal and has been at home for several months. Her physical condition improved rapidly while taking the treatment and during this time she gained twenty-five pounds in weight.

#### CASE IV

Emma Kruger, female, aged forty. Dementia praecox (catatonia), mutism, resistant, fixed position, refuses hand, etc., very much emaciated, had been tubed or forcibly fed for more than a year. Transferred to this institution from the Laurel Retreat, Maryland. Date of admission here, May 20, 1917. Was insane previous to commitment several months. Was a patient at this institution two months before this treatment was administered.

At the time the patient was admitted to this institution, the diagnosis and prognosis, as originally made was fully concurred in by the medical staff at this institution. In fact, "Incurable" was stamped on the patient's countenance and general attitude, and she had the makeup of advanced, chronic, and incurable insanity. Was discharged February 20, 1918. Doing well at latest report, April 9, 1918.

The infusion was given as follows: 1,000 cc., 1,000 cc., 500 cc., 800 cc., 800 cc., 600 cc., 500 cc., 750 cc., 750 cc., 725 cc., 625 cc., 425 cc., 800 cc., 500 cc., 700 cc., 850 cc., 1,000 cc.

*Results:* Within twenty-four hours after first infusion, she voluntarily went to the table and ate her first meal since her admission here. After second infusion, when the attendant told her to go to the scales and be weighed, she immediately complied, very much to our surprise, but no other change in her condition. Following third infusion there was no change except a slight gain in weight. Fourth and fifth infusions and condition remains the same. After sixth infusion there was no apparent change for two weeks, when she unexpectedly complied with the physician's request and shook hands with him and replied to a question that "she felt all right." At this time she manifests interest in work about the ward—makes her own bed, goes to table and feeds herself, eats heartily and has put on a considerable amount of weight. Is gradually getting better. Later, is normal in manner and conversation, takes long walks by herself and with other patients. Takes interest in needle work, crocheting, etc., and works several hours a day at the general kitchen and does all this voluntarily and in a contented frame of mind, except that she says she wants to go home to her people. To all appearances she has been restored to her normal mental condition. After remaining in this condition some three or four months, apparently in good health, she returned to her family in Wheeling, West Virginia, and I am recently informed, is normal in every respect (March 9, 1918). This case is of particular interest, as she had been pronounced an incurable dementia praecox by competent physicians in Baltimore where the diagnosis had been made. I agreed in the diagnosis and prognosis and commenced the treatment without faith in results.

#### CASE XI

Laura Oliver, female, aged thirty-five. Dementia praecox (catatonia), depressed, mutism, negativism, fixed position, emaciated, very unclean. Necessary to use forced feeding for past several months. Patient very indifferent to surroundings. Date of admission, July 28, 1917. Was insane several months previous to admission. Was a patient at this institution eight days before this treatment was administered. Was discharged March 15, 1918.

The infusion was given as follows: 900 cc., 1,000 cc., 1,000 cc., 175 cc., 375 cc., 650 cc., 800 cc., 750 cc., 730 cc., 825 cc., 825 cc., 700 cc., 500 cc., 750 cc.

*Results:* Patient has shown a slow but gradual improvement from the time of first infusion. This was noticed by the patient going to the table and eating her meals without being forced or helped. After first infusion,

gave her answers to questions in monosyllables and rate of thought was very slow and hesitating, but she now gives prompt and intelligent answers, is clean in habits, has put on weight rapidly, and is very easily managed. Writes intelligent letter to her husband and shows satisfactory improvement. Is beginning to become homesick and shows a normal desire to see her children. Later: Husband has removed her from the institution to her home and I am informed that she is assisting in the care of her children and getting along nicely. I regret that this case did not remain with us a few months longer.

#### CASE XII

M. M., female, aged twenty-eight. Dementia praecox (catatonia), stupor, mutism, negativism, resistant, fixed position, unclean, etc. Date



Fig. 1. Catatonic Dementia Praecox, Bizarre Position. Photograph by L. V. Guthrie.

of admission, April 18, 1913. This patient had been insane more than five years previous to admission to this institution and had been gradually getting worse from the beginning. She had been under my personal observation more than ten years previous to giving the Isotonic Salt Solution.

The infusion was given as follows: (1917) May 13, 550 cc., May 20, 700 cc., June 6, 800 cc., July 15, 500 cc., July 21, 1,000 cc., August 12, 650 cc., December 15, 330 cc., December 18, 750 cc., (1918) January 1, 600 cc., January 14, 1,000 cc., January 29, 1,000 cc., February 5, 1,000 cc., March 15, 500 cc.

*Results:* The treatment was commenced May 13, 1917, but after giving

the infusion at intervals of seven months, patient's condition was practically unchanged, with the exception that she complained that the needle gave her pain, while previous to this time she had lain in a stupor on the table and had not seemed to notice when the needle was used. After taking ten injections, covering a period of several months, she had a lucid interval—went to the mirror, dressed her hair and remarked in regard to her personal appearance, "I wouldn't have thought it." On the same day she went to



Fig. 2. Egyptian Mummy Position. A well marked and grave condition of Dementia Praecox. Photograph by L. V. Guthrie.

the piano and played as any normal person would do and carried on an interesting conversation with her sister. However, since that time, January, 1918, she has relapsed into her former condition—stays in bed practically all of the time and has applied so much pressure to her chin with fingers and thumbs (see Fig. 3.) that there has been a very noticeable atrophy of the tissues. The only lucid interval this patient has had at any time while in this institution occurred during the month of January, 1918, and I think it more than a coincidence that this was the only month in which she had her treatment in full sized doses and at more frequent intervals than during any other month.

I have had much better results in the treatment of females than males. However, several of the male patients have shown considerable improvement but none of them have been cured. In no instance have we seen an elevation of temperature or unfavorable symptom follow the use of these

injections and in this, and also in the number of cases showing decided improvement and cures it seems that we have had better results than Ishida.



Fig. 3. Case XII. M. M., Catatonia with Bizarre Position. Patient sits in this position for many hours at a time. Photograph by L. V. Guthrie.

Huntington, W. Va., April 9, 1918.

## EDITORIAL COMMENTS

### I.

With the permission of the editor of *The American Journal of Insanity*, in which Ishida's original article on the use of Isotonic Salt Solution in the treatment of this disease was originally published, Dr. K. Sasano has made the following abstract which should be considered with the preceding article.

Case I.—K. Miyabara, female, twenty-two years old, suffering from Dementia Heberphrenia for eighteen months previous to entering the hospital. Before treatment the predominating symptoms were, loss of interest, impoverishment of ideas, echolalia, emotional deterioration, meaningless laughter, soliloquy, weeping, taciturnity, catalepsy, destruction of clothing, and the handling of excrement. She was under observation for a period of four months during which time she gave no signs of improvement. The first infusion of 0.9 per cent common salt solution was given in the fifth month. At intervals of two weeks and the last one in the third week the following infusions were given: 1,000 cc., 700 cc., 1,000 cc.

Before the first infusion the patient had a fever of unknown cause which did not yield to the administration of a normal dose of Pyramidin, but disappeared immediately after the first infusion. After the second infusion the handling of excrement ceased, an interest in work gradually returned and she began to knit, wash, dust, comb her hair, and then assist the nurses. In short a remission has taken place which has lasted four months, the time of writing this article.

Case II.—K. Honda, male, nineteen years old, suffering from dementia praecox (catatonic type) for one month before entering the hospital. Predominating symptoms before the infusion were: negativism, catatonic posture, taciturnity, impoverished ideas, emotional deterioration, and coprophagy. Infusions given as follows: January 8th, 600 cc., February 18th, 300 cc., March 3rd, 500 cc., April 5th, 500 cc.

No marked reaction was noticed until the third infusion had been given when the coprophagy suddenly disappeared, then the response to the calling of his name returned, and for the first time he enjoyed his mother's company. The coprophagy had not returned at death, two years afterward.

Case III.—K. Takamoto, female, aged twenty-three years, onset of psychosis three months before admission to hospital. Diagnosis, hebephrenia. Before treatment the predominating symptoms were: delusion of persecution, auditory hallucination, meaningless laughter and weeping, soliloquy, passivity, seclusion, and insomnia. Infusions of 0.9 per cent natural salt solution were given on June 29th and on July 9th both infusions consisting of 500 cc.

Renewed interest in work appeared after the first infusion, followed by the disappearance of the other symptoms, one by one. In September of the same year she was in a state of remission that continues to the present observations three months later.

Case IV.—T. Kikuchi, male, fifty years old, onset of psychosis four months previous to date of admission. Diagnosis, dementia paraphrenia. Predominating symptoms before treatment were: delusion of persecution, auditory hallucinations, and repeated attempts at suicide. Three weeks after admission he was given an infusion of 1,000 cc., 0.9 per cent normal salt solution. On the following day there was high fever and vomiting. On the third day he felt much better. At the end of one month he was sufficiently recovered to express his gratitude for the treatment, and to feel shame for his attempts at self-destruction. After two and one-half months of observation he was discharged as cured.

Case V.—S. Nakajima, female, eighteen years old, onset of psychosis ten days before entering hospital. Diagnosis, hebephrenia. Predominating symptoms before treatment were: emotional indifference, taciturnity, and thievery. After the first infusion of 500 cc. normal solution on July 19th she began to speak more distinctly, became more alert in expression, and after the second infusion on July 26th she began to dust her room. In August of the same year her improvement was such that she was sent home to be under her mother's care and she is still in good health.

Case VI.—Higashi, male, thirty-three years old, onset of psychosis one month before date of admission. Diagnosis, dementia catatonia. Predominating symptoms before treatment were: stereotypy, taciturnity, hypochondriacal ideas, and weeping at time of examination. He was in this condition for six months. On July 9th the first infusion of 1,000 cc. of normal solution was given. At the examination of the fourth day afterward he did not weep and answered questions for the first time. He remained under observation from that time to February of the next year when another infusion was given. The February infusion instead of the usual 0.9 per cent was a 0.6 per cent solution to which there was no reaction until three months later when a sudden remission occurred. No doubt this remission is the indirect effect of NaCl.

Case VII.—T. Ishinose, male, twenty-four years old, onset of psychosis dates from three months before entrance to hospital. Diagnosis, dementia paranoid. Predominating symptoms before treatment were: negativism, scrutiny of food and medicine, auditory hallucinations, delusions of grandeur and of persecution, combativeness, frequent efforts to strike the doctors. The second day after the initial infusion he declared that he would no longer consider the doctor an enemy. From this time on he became tractable.

Case VIII.—G. Kurihara, male, thirty-eight years old, onset of psychosis ten days before admission. Diagnosis, dementia catatonia. Predom-

inating symptoms before treatment were: catatonia, play with excrement, delusions of grandeur and persecution, and negativism. On the third day after admission an infusion of 1,000 cc., 0.9 per cent normal salt solution was given. This infusion was followed by a high fever lasting three days and an improvement in mental condition that lasted but one month when the patient relapsed into his former condition.

Case IX.—W. Machida, male, twenty-four years old. Onset of psychosis nine months previous to admission. Diagnosis, dementia hebephrenia. The predominating symptoms before treatment were: visual and auditory hallucinations, meaningless laughter and weeping, and catatonic posture. After two months of observation the patient was given a 500 cc. infusion of 0.6 per cent solution, after which he began to take note of his surroundings, and another infusion two weeks later produced a remission.

Case X.—T. Mawatari, female, aged thirty-two years, onset of psychosis nine months before entering hospital. Diagnosis, dementia catatonia. Predominating symptoms before treatment were: delusion of persecution, negativism, and auditory hallucination. After two months of observation an infusion of 500 cc., 0.6 per cent salt solution, was given, and a second infusion of 540 cc. was given in the fifth week. The only result observable was the patient's increased interest in her environment.

The most troublesome types of insanity are "coprophagy" and "handling of excrement," and these are very successfully treated by the infusion of normal salt solution. In nearly fifty per cent of cases interest in surroundings has been aroused, and in fully forty per cent of cases a condition resembling that of remission has been produced after the first infusion.

## II.

The use of normal salt solutions in the treatment of this disease followed a less successful use of Lundvall's sodium nucleate solution. In a recent number of the *Siglo Medico*, Madrid, Dr. G. R. Lafora\* has discussed the physical conditions found in patients suffering from dementia praecox and presents a number of very interesting recoveries after treatment.

The pessimism which has attended the diagnosis of this disease in modern times makes these reports doubly suggestive and valuable.

Case I.—Boy, eighteen years old, hebephrenic, catatonic. Received twelve injections of progressively increased (up to 100 cc.) doses of a two per cent sodium nucleate solution. After the third or fourth injection a complete change was noted in the patient; he no longer wet his bed nor defecated except when at the toilet. After the seventh injection his mental condition became normal. His physical condition steadily improved, his weight increased, and his skin showed a healthy color. Vasomotor symp-

\*Lafora, G. R., *Nuevo tratamientos causal de la demencia precoz y concepcion de su patogenia*. *Siglo med.*, Madrid, 1917 Ixiv, 947.

toms disappeared. He has been cured a year, during which time he has been regularly employed at his trade.

Case II.—Woman, thirty-eight years old, hebephrenic. During the past nine years this patient has had three violent hebephrenic attacks. A certain relative tranquility followed the initiation of treatment, but certain symptoms persisted for over two years. She was given twenty more injections and her condition became normal, her weight increased, and she was pronounced cured. She has remained well for nearly a year.

Case III.—Woman, twenty-one years old, hebephrenic. Has had a second violent attack, with sleeplessness, and loss of control of excretory sphincters. After receiving ten injections of the sodium nucleate solution her violent resistance ceased, and control of urine and feces was obtained. After the twenty-first injection she became completely normal. Normal physically and mentally for past eight months. Menstruation restored.

Case IV.—Woman, twenty-five years old, heboid-phrenic. Has been ill for the past five years and lately her symptoms have been absolute indifference to all things, and fixity of posture. After two months of treatment, during which time she received fourteen injections, she is completely cured, conducting herself properly and speaking normally.

Case V.—Youth, nineteen years old, hebephrenic. Has been demented for four months past. Indifferent to all things, hopeless, depressed, and makes no effort to control a salivary dribble. After eight, increasingly enlarged, injections is completely cured. Replies readily to questions and has become merry and communicative. Has been cured for a period of six months.

Case VI.—Woman of twenty-eight years. Hebephrenic disturbances. Has had attacks of mental aberration at varying intervals during the past nine years. Treatment by electricity failed. After eight or ten injections of sodium nucleate she commenced to improve and has steadily continued to do so. Now, after twenty-six or twenty-eight injections, she has recovered her cheerfulness and is completely equal to her condition prior to the beginning of her mental troubles.

Case VII.—Young doctor of twenty-six years. Hebephrenic. Has hallucinations, suffers from insomnia, excitation, and confused ideas. These symptoms recurred after treatment. Following treatment with sodium nucleate solution for twenty-five days, his intellect cleared, his appetite returned, and all confusion disappeared. His weight has increased.

Case VIII.—Youth of seventeen years. Heboid-phrenic disturbances. For sixteen months he has been in a distracted and indifferent state. He leaves home and does not return. While away from home walks about without any plan or special object in view. He is much better after one month of sodium nucleate treatment.

Case IX.—Youth of nineteen years. Hebephrenic. His symptoms have been visible for six years. Lately he has been given ten injections of

sodium nucleate during a period of two months. He is now recuperating at a sanitarium and his letters show him to be rational, and tell that the old symptoms have disappeared.

Case X.—Man of twenty-four years. Paranoid dementia. Symptoms first noticed five years ago. He was later committed to an asylum. Mentally deficient. Following twelve injections he is considerably improved, will answer questions and talk naturally. However, a month later he suddenly became suspicious and refused further treatments.

Case XI.—Woman, eighteen years old. Hebephrenic. Symptoms have been present for two years. Pronounced signs of mental disturbance. Nuclein injections with control of hematologic injections recommended. Eight injections have been given and a slight improvement has been observed. This announcement a bit premature as the patient has been under treatment only one month.

Case XII.—A woman of thirty-two years. Hebephrenic. This is her third attack of excitement and incoherency. Injections were undertaken but found impossible to continue them after the second attempt. No results have been noted.

It is scarcely possible from these cases to determine whether the permanent continuation of sodium nucleate treatment in attenuated doses would effect a permanent and definite recovery. The experiment, however, would be worthy of trial.

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#### DOES IT PAY TO CURE?

Elsewhere in this number Dr. L. V. Guthrie recounts his success in contributing fifteen thousand dollars to the Commonwealth of West Virginia by restoring five females to their several distracted and woe-weary families.

We can not help but wonder how his Board of Control looks upon this therapeutic adventure. Have they offered him additions to his medical staff and adequate equipment to carry on his work in a more extensive, intensive, and systematic manner? Or have they, perhaps, pushed down the soft pedal and called for "watchful waiting," the method of easy going?

Is there any other State Hospital among the three hundred in the United States where the same efforts have been made to cure? Have any Boards of Control urged their medical staffs to try out this method of Guthrie's on their female patients? Has the Board of Control of West Virginia instituted similar methods of treatment in their other State Hospital?

In January, 1918, there were more than two thousand insane persons in West Virginia, and probably sixty per cent. of these sufferers were cases of dementia praecox. That means that there were twelve hundred dementia praecox patients in the State for whom custody alone, during their average life of fifteen years, would be a liability of three thousand dollars each to the state treasury, or an aggregate liability of \$3,600,000. This is not an

insignificant sum in war times. By curing five patients Dr. Guthrie has removed fifteen thousand dollars from this liability, while the labor of these five patients and the added usefulness of their happier families is a positive though indirect asset that any statistician would not fail to consider. If the desire for cure were equal to the drive for economy which the war has forced upon our forty-eight Boards of Administration of lunacy, the 140,000 dementia praecox patients now confined in our State Hospitals would not all die in custody.

With the scant publicity which this method of cure has received there are many sad and desperately pathetic letters coming to the curing doctors, begging for assistance which the bureaucratic ruling of state officers has too often denied. Suppose that only one in ten is cured by this method, West Virginia could be relieved of 120 patients now in custody and \$360,000 could be stricken from the liabilities of the state treasury.

West Virginia is a small state, New York is a large one. During nine months (ending July 30, 1916) 1,213 dementia praecox patients were admitted to the State Hospitals of New York, or 1,617 for the year. If only ten per cent. of these were cured, there would be an annual reduction of the State's liabilities of not less than \$483,000. Only seventeen patients recovered in nine months, twenty-two, not 161, for the year! If the furore for cure in any degree approached the furore for economy, for cosmetic cleanliness, for system, for standardization, for institutional serenity, can anyone doubt that such a pitiable showing would be made in New York, our largest, richest, and most enlightened State?

New York has a Psychiatric Institute for which the State expends twenty-five thousand dollars a year, while seven million dollars are spent on custody. This is hardly economy. Is not the greater economy to effect a cure?

B. H.

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I will digress to say that not everything is research, in agriculture or elsewhere, that happens to bear the name. Undoubtedly research, as such, has been over-glorified. There is no sanctity in research that does not inhere also in any other good and honest effort requiring ability. The teacher is as worthy of honor as the investigator.

Neither is research a refuge. Certain persons who bear something of a disdain for the affairs of the world are likely to be set at more or less interesting problems under the denomination of "original investigation" and "research," and "pieces of work." Here they may find shelter and protection, and a certain deference that is very conducive to peace of mind. They are supposed "to publish," whereupon their standing is established among their fellows. It may not be necessary to raise the question as to the significance of the publication or whether it reaches any result.

L. H. BAILEY.

## DEMENTIA PRAECOX ASSOCIATED WITH UNCINARIASIS\*

BY DR. EUGENE D. BONDURANT

We in the South have long since learned to regard the hook-worm as a possible causative factor in the psychoses and other nervous disturbances of childhood and early adult life. We see the anemia and toxemia caused by this parasite exert its uniformly unfavorable influence over mental development; we see it contribute toward the production of epilepsy, hysteroid states, confusional psychoses, and other nervous disturbances, and we see these nervous disease syndromes disappear when the parasites are driven from the intestinal tract.

It is, however, not often that a hookworm infection constitutes the sole exciting cause of a genuine dementia praecox. Such an instance is nevertheless offered by the case herewith briefly recorded:

C. W. J., a young school girl, sixteen, previously healthy and mentally sound, of above the average intelligence. Family history alleged to be free from taint of neuro-degeneracy, but her mother has been "nervous" at times.

The girl spent the summer visiting in the country. She went without her shoes part of the time and "had ground itch terribly."

Shortly after this she began growing pale and weak, became listless and indifferent and had shortness of breath. When she came home she was mentally dull and "seemed different."

Upon returning to school in the autumn she found that her work was too hard for her and that she "could not learn." Whereas during former years she had been bright, intelligent, active, attentive and had stood near the head of her class (third year high school), she was now dull, apathetic, inattentive, given to dreaming, and at times seemed dazed and confused. She soon grew worried and despondent and cried a good deal.

As the days passed she grew steadily worse, became more apathetic, completely unable to learn anything or to fix her attention upon her tasks; she grew slovenly in her habits, talked to herself and was silly and feeble-minded to the last degree. Six weeks after the school term began her teacher requested the parents to take her out of school, as she was unable to learn and her "mind was affected."

Rest at home did no good and she was then brought to me for examination and advice. The condition shown at this time was a fairly typical hebephrenic dementia praecox. The girl would sit immovable, staring at vacancy, noticing nothing. She would not converse, would rarely answer questions and then in monosyllables or irrelevantly. Now and then she would smile or giggle foolishly. At times she would move aimlessly about and whisper to herself meaningless words. She would make no complaint and did not seem distressed—merely apathetic, dull and devoid of mental activity. She was said to be entirely indifferent to her personal appearance,

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\*Read by title before the American Neurological Association, May 8, 9, 10, 1916.

would not put on her clothing, nor undress herself at night; was unclean in her personal habits; would at times not take the trouble to eat, although she would chew and swallow food put in her mouth.

There was a partial anesthesia over entire eutaneous surface. There were no cataleptoid symptoms.

She was well nourished, but pale, flabby and cachetic; extremities cold and blue; circulation sluggish; heart sounds, weak; blowing anemic murmur; blood pressure, low; temperature, subnormal; hemoglobin percentage 40; marked eosinophilia. Examination of feces showed the presence of hookworm ova in unusual numbers.

She was constipated; had not menstruated in four months.

The patient was put in bed and given no food for one day. That night she received five grains of calomel and the next morning one ounce of Epsom salts. After free movement from the bowels she was given ten grains of powdered thymol in a capsule every twenty minutes until sixty grains were taken. Two hours after the last dose of thymol she had a second dose of Epsom salts. About fifteen hundred (1,500) hookworms were expelled. She was ordered a liberal dietary, an iron tonic and rest in bed for ten days. Improvement was immediate and recovery rapid and complete.

Before the ten days' rest was finished all symptoms of mental retardation, instability, and defect had completely disappeared and the memory, reasoning powers, power of attention, as well as the emotional state, were practically normal.

One month later the child returned to school, made up her deficiencies and completed the work of the year with her class and with credit.

The patient has remained perfectly well to the present time (three years), there being no trace of mental or nervous instability, peculiarity, nor defect to suggest the occurrence of a former severe psychie disintegration.

Mobile, Alabama.

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Modern discoveries have not been made by large collections of facts, with subsequent discussion, separation and resulting deduction of a truth thus rendered perceptible. A few facts have suggested an hypothesis, which means a supposition, proper to explain them. The necessary results of this supposition are worked out, and then, and not until then, other facts are examined to see if these are found in nature. The trial of the hypothesis is the *special object*: prior to which, hypothesis must have been started, not by rule, but by that sagacity of which no description can be given, precisely because the very owners of it do not act under laws perceptible to themselves.

AUGUSTUS DE MORGAN, in *A Budget of Paradoxes*.

## EDITORIAL COMMENT

This short contribution to the therapy of dementia praecox becomes more significant if taken into consideration with the publications of Austregesilo of Rio Janeiro, the last of which appeared in the New Orleans Medical and Surgical Journal for December, 1917 (lxx, 513-529).

It is well known to all clinicians and practitioners of medicine that mental disturbances appear in the acute infectious diseases, sometimes coincident with the high fever and sometimes as the result of intoxication when the fever has disappeared. It is also well recognized that in non-infectious conditions, as cardiac incompetency, CO poisoning, and military gassing, mental disturbances appear which can be looked upon as toxic.

The effects of hookworm disease are often and characteristically manifested in the blood picture. The eosinophilia is diagnostic. But in onchocerciasis or ancylostomiasis pernicious anemia as well as mental aberration are common enough to require special treatment.

In folk medicine, both among savages and civilized men, worms play a great part in the nervous condition of children. In early works on psychiatry the same obvious condition of parasitism was considered causative and vermicides were freely used. Even Esquirol looked upon worms as a considerable factor in mental disturbances. Austregesilo and Gotuzzo<sup>1</sup> gave the histories of three patients observed in a Brazilian Hospital for the Insane in 1906, who seemed to be insane and demented as the result of hookworm parasitism and recovered when the worms were driven off. Briefly these cases were as follows:

1. This Brazilian, twenty-six years old, was an educated boy, the son of an hysterical mother. There was no syphilis and no alcoholism. On admission to the asylum in October, 1906, he was mute, melancholy, and resistant. A little later he began to talk and complained of severe pain in his head and in his abdomen. He said he had been weak and short winded for more than a month. He attributed his suffering to poisons administered by people with whom he had lived.

He was markedly anemic and there was a systolic murmur in the fourth interspace, and some edema in the lower lids and face. The eosinophiles were greatly increased and onchocercia eggs were found in the stools. Thymol was given in capsules of 1.0 grm. each every four hours for twenty-four hours.

The patient improved promptly, the pain and air hunger disappeared. The delirium and hallucinations diminished and by the last of November disappeared. He was discharged on December fifteenth without delirium and without worms.

2. A nineteen-year-old, educated boy from Saint Paulo entered the asylum in October, 1906 with very pale lips and skin, blue sclera, and edema of the eyelids. There was a preinfundibular murmur of anemic origin. The

eosinophiles formed eighteen per cent. of a slight leucocytosis of a low erythrocyte and hemoglobin-poor blood. *Uneinaria* eggs in enormous quantities were found in the feces. There was no syphilis and no alcoholism.

The patient was much demented and was an excessive masturbator. He was delusional and religiose without system.

Thymol treatment resulted in recovery and he was discharged as well on December fourteenth.

3. A young, colored Brazilian, who did not know his age, entered the asylum March 12, 1906. He appeared to suffer from *uneinaria* and examinations of the stool demonstrated the eggs. His hemoglobin index was 35, clotting in 1 minute, 10 seconds. There were 3,100,000 erythrocytes, 12 per cent. large lymphocytes, 6 per cent. mononuclears, 52 per cent. polymorphs, with 16 per cent. eosinophiles. He was much deteriorated and a masturbator. He had lost orientation for time and place. He was sarcastic and ironical, and contemptuous of everybody and everything. The thymol treatment was followed by recovery with little defect.

In these cases the *ancylostomiasis* was, in the opinion of the observers, the proximate cause of the mental disease. The removal of the worms cured the morbid mental condition. Since Lussani's demonstration it has been known that the hookworm secretes a toxic substance. The blood reaction to this toxic substance is clinically recognized by the eosinophilia. In one individual the most conspicuous picture is that of pernicious anemia; in another it is infantilism; and in a few it is progressive dementia.

Sometimes suggestive hints in research come from remarkably isolated observations which are brought together by clinical experience. The thymol treatment of hookworm disease has resulted in recovery from morbid psychoses resembling dementia praecox. The appendiceotomy and irrigation of a patient with amebiasis resulted in recovery of the dysphrenia.<sup>2</sup> When pellagra patients are placed on a proper diet and recover, the mental symptoms also disappear. Patients who are successfully treated for the sleeping sickness recover their mental health in an incredible manner.

It is likely that perverted mental function may come from a purely toxic condition without any morphologic change in the brain structure. Such disturbances of cerebration are observed in voluntary alcoholie intoxication and in alkaloidal poisoning. Doubtless the cerebral disturbances so often observed in children with intestinal disorders are similarly toxic and not histomorphologic for they recover so rapidly when the stomach and colon are emptied.

It is equally likely that histomorphologic changes in the brain with no toxemia, may produce indistinguishable mental aberrations, for in shell-shock and similar molecular brain concussions a whole bundle of abnormal mental symptoms appear. These two groups of mental phenomena so completely different in their etiology are otherwise indistinguishable. The

psychopathologic picture is determined less by the etiologic, extrinsic force than by the intrinsic cerebral mechanism; less by the toxic molecule and the cellular trauma than by the structure of the brain itself. Children, women and young persons suffer mental disturbances on less provocation than adult males, and the injured and the phlegmatic, more than the nervous, temperamental, and highly trained.

Clinicians recognize the significance of groups of synergistic factors in the production of disease and naturally of mental illness. It is often treatment enough to bring about recovery of the most obvious tuberculous bone necrosis, for example, to remove a single adverse factor in the immeasurable cabal of factors. The work of Rollier<sup>3</sup> in the Alps was a dramatic and memorable example of this therapeutic strategy.

The importance of synergism should be considered in our explanation of the origin of mental derangements in the course of uncinariasis. The toxin which acts upon the brain in such a manner as to produce the symptoms of insanity in adolescents is probably produced in the bodies of all young persons, but not in such quantities as to produce symptoms, or, if produced in sufficient quantities, the excretory or detoxicating action of the liver is adequate to its reduction and excretion. When, however, the toxic substance extracted from the hookworm is added to the toxin already in the blood, to whose action it happens to be synergistic, or when it is added to the burden of the liver already taxed to the utmost by the load of intestinal toxins, the susceptible locality of the brain cortex gives way as Southard and Canavan<sup>4</sup> have shown in their histomorphologic studies.

In either case the removal of the hookworms by the action of the thymol takes away the burden of the toxins on the liver, or removes the activating influence on the circulating toxins in the brain, and recovery follows.

In the case of amebiasis reported by Dr. Ernest<sup>2</sup> the same rationale prevails with the accidental advantage of removing by cecal irrigation the toxic amines that have been produced in the colon from the breaking down of the cecal contents by the flora of this viscus. It is possible that by closer observation some cases of amebiasis will be discovered among cases of clinical dementia praecox and that the hypodermic use of emetine will be sufficient to turn the tide of health to recovery both of the parasitism and of the mental derangement.

The lesson of Dr. Bondurant's case is obvious. It enforces the obligation to research for cure. The recovery of this single patient will relieve the State of Alabama of a liability exceeding three thousand dollars and give to the State a self-supporting and productive citizen. The morale of a hospital staff where researches for cure are prosecuted, even with occasional recoveries of otherwise hopeless cases, cannot fail to be improved. Such instances should be forced upon the attention of boards of control and legislative committees with a reasonable demand for facilities of investigation.

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In Spain the mental condition or point of view of the psychiatrists does not preclude the careful study of the obviously insane to discover physical ailments. The following is from a modern treatise on insanity, by a reputable Spaniard.\*

The nutrition of all patients should be carefully supervised, and physical examination of the digestive apparatus should not be neglected. "Of all the organic functions," says Cullere, "the digestion in insanity shows the most noteworthy disturbances." To this we would add that study of digestive disorders in mental aberration is extremely important under actual conditions, because of the value which is attributed to auto-intoxications in the production of mental disturbances. (Regis, Jacobson, Obersteiner, Wagner, Roubinovitch.)

Other disturbances to which attention should be directed are those of deglutition, rumination (Seglas, Bourneville), vomiting, straining at stool are all frequently seen in cases of mental alienation. Great importance attaches to coprostasis because the retention of fecal matter appears to cause absorption of toxic products that are capable of producing nervous irregularities. Finally there are the diarrheas, including the vaso-paralytic and trophic forms, which have a nervous origin and are mentioned in some mental cases (melancholia, dementia) and are resistant to every treatment.

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\*Riera, I. Giménez: *La Locura—Diagnóstico y Tratamiento de las Enfermedades Mentales*. Zaragoza, 1911.

## HISTOLOGICAL EXAMINATION OF THE OVARIES IN MENTAL DISEASE\*

By LAURA FORSTER

The following paper is the result of an investigation of human ovaries, carried out in the Pathological Laboratory, Clayburn Asylum. The work was suggested to me by Dr. F. W. Mott, who considered that a systematic examination of the ovaries in cases of mental disease would be of medical and social importance.

There are two periods of life in the female when the onset of insanity especially occurs, viz., early adolescence and the involutional period. This has been very clearly shown by Dr. Mott in a collective investigation of over four thousand related cases, who are at present in, or who have been discharged from, or who have died in the London County Asylums. The parents of these insane offspring, in nearly fifty per cent of the cases affected, have their first attack during the involution period from 45-60. Furthermore, Dr. Mott has found certain types of mental degeneration associated with absence of ova in the glands; others with absence of signs of maturation in the ova, both indications of sterility; he considers the latter is further evidence of "anticipation," by which the children of insane parents are affected at a much earlier age than the parents, and in a more intense form. This may be a way in which Nature tends to end, if it cannot mend, a degenerate stock.

As evidence of the correlation of brain and sexual glands, Ceni's experiments on birds are important. He removed one hemisphere, and the birds surviving the traumatic shock were killed after periods varying from a few months to three years, and their ovaries were subsequently examined histologically. The primary shock had the effect of causing them to cease laying eggs for some months. In the following year they began to lay again, but in the second year few eggs were laid, or they ceased altogether from laying. The birds were otherwise in a healthy condition. The examination of the ovaries showed premature progressive involution. The writer considers that the changes in the ovaries are an expression of a permanent state of functional torpor of the organ, in consequence of which ovulation is more limited than under normal conditions, and finally becomes entirely arrested. The arrest of this function causes a rapid and progressive involution, which affects the whole parenchyma of the ovary, and may be taken as a premature dynamic exhaustion of the sexual gland. The conclusions drawn are that there are very intimate dynamic relations between the brain and the ovary, the function of the latter being directly dependent on the anatomical and

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\*Presented by Dr. F. W. Mott to the Royal Medical Society, March 13, 1917, and published in the Proceedings, Psychiatric Section, 1917, x, pp. 65-87.

functional integrity of the brain. The writer considers that these facts have an important bearing on the question of reproduction in the physically unfit.

The ovary has of late received rather a prominent place as an important secreting gland. I refer my readers to Biedl's exhaustive work on internal secretion, where a very full list may be found of all the writers who have studied this question anatomically and physiologically. The parts of the ovary credited with the function of secretion are the corpus luteum and the atretic follicle. Limon made a comparative histological study of the ovaries of various animals, and states that the tissue arising out of the atretic follicle, through proliferation of the theca interna, consists of cells of epithelioid form, and he gives it the name of "glande interstitielle de l'ovaire." He has found these epithelial cells in numerous groups embedded in the stroma of certain animals. Fraenkel likewise made a detailed examination of the ovaries of animals, and also of human ones. He found these epithelioid cells in numbers in the ovaries of certain animals, more especially the rodents, but they were entirely absent in the anthropoids and man. He concludes, therefore, that this tissue cannot be responsible for a large, general and important function.

Dr. Mott kindly supplied me with all the material available at the Pathological Laboratory, Clayburn, and also sent me some from Charing Cross Hospital. For the rest, I am indebted to Dr. Turnbull, director of the Pathological Institute, London Hospital, and to the following Medical Superintendents of the London County Asylums: Dr. Ogilvy, of Long Grove; Dr. Baily, of Hanwell; Dr. Gilfillan, of Colney Hatch; Dr. Stansfield, of Bexley; Dr. Lord, of Horton; Dr. Donaldson, of the Manor Asylum; Sir James Moody, of Canehill; and to Dr. Elkins, of Leavesden; and Dr. Campbell, of Caterham.

The ovaries were taken from one hundred cases of persons who had died in the London County Asylums, and included cases diagnosed as dementia praecox, mania, melancholia, general paralysis of the insane, epilepsy, and imbecility. To control the above cases, ovaries were taken from women and children who had died in the London and Charing Cross Hospitals. The control ovaries cannot, however, be considered as entirely satisfactory, as many of them were taken from persons who had died from a long-standing disease. For instance, those belonging to a woman, aged thirty-two, with chronic interstitial nephritis, showed complete involution.

#### *Methods*

The ovaries were fixed in Müller's fluid, and then taken through various strengths of alcohol. A certain number were embedded in paraffin, but for the majority celloidin was used, as it causes less shrinkage. The blocks were cut into serial sections, and in cases where the Graafian follicles were scanty in number, the whole of the ovary was cut through in this manner. In

other cases it was considered sufficient to cut a series of one block only. The majority of sections were stained after cutting with hematoxylin and eosin. A certain number of blocks were stained by the alum-earmine method before cutting, and afterwards counterstained with eosin.

### *Histology of the Normal Human Ovary*

The stroma of the human ovary consists essentially of a dense network of fibrous bands, interspersed in places by smooth muscle-fibers, and through which blood vessels run. In the stroma the Graafian follicles, each of which consists of a layer of epithelium, bounded on its outer edge by a basement membrane. Lying within the follicle is the ovum, surrounded by its zona pellucida. As the follicle increases in size the epithelial layers become multiplied, and at a certain stage of development the disceus proligerus is formed. This is a thickening of the epithelium at one end of the follicle, in which the ovum can be seen embedded. The Graafian follicles vary considerably in number according to the age of the individual. In the newborn and quite young person the larger part of the stroma consists of follicles, but as age advances and the follicles diminish in number, either by rupture or atresia, their place is filled by the so-called corpora lutea, which, in their turn, disappearing, give way to fibrous tissue. I have not observed in the human ovary those groups of epithelioid cells noticed by Heape in abundance in the rabbit, and by Limon in the rabbit and rodents. I noticed two principal forms of corpus luteum, which occur in varying numbers throughout the stroma, the size of which varies considerably. The first I have not been able to follow in its development, and have only noticed it in one phase, where it consists of a nodule of non-cellular protoplasm (which takes a deep eosin stain) separated off into columns by thin trabeculae of connective tissue, which converge to a central strand, forming the axis of the nodule. I believe this is the form which follows the rupture of a follicle. The second form is the one taking the place of the follicle which undergoes atresia. It consists of a nodule of loosely arranged connective tissue, separated off by delicate bands of denser connective tissue. I have noticed a number of these in process of formation round a degenerating ovum which has lost its surrounding membrana granulosa. The zona pellucida often remains intact after the nucleus has lost its power of staining, and the plasma is shrunken.

These two forms of corpus luteum are quite different in appearance, and according to Paladin and Beigel's acceptation of the terms, I have called the former "corpus luteum verum" and the latter "corpus luteum spurium." The name of corpus luteum verum is attached by some authors to that form only which occurs when pregnancy takes place. However, as the difference between those occurring with or without pregnancy seems to be only a question of size, the designation does not seem to me justified, and as Lawson Tait says, "the belief that there is such a thing as a true corpus

TABLE I

No.	Nature of disease	Age at first attack	Age at admission	Age at death	Condition of ovaries	Menstruation	Pregnancies and results	Married or Single
1	Dementia praecox	19	19	24	Connective tissue increased; 11 ova at one level; some corpora lutea present	Regular until one year before death	Nil	Single
2	Dementia praecox	29	30	33	39 follicles at one level; some corpora lutea present	Began at 13; ceased two years before death	Nil	Single
3	Stupor and rapid mental enfeeblement	39	39	39	Advanced involution; no follicles detected; no corpora lutea seen	Began at 14 and ceased seven months before death	Nil	Married
4	Dementia praecox; delusional insanity	19	19	19	59 follicles at one level; no true corpora lutea noticed	No history	Nil	Single
5	Suicidal dementia	24	32	34	35 follicles at one level and mostly immature ones; a few small corpora lutea vera present	Began at 16; irregular during mental attacks	Nil	Single
6	Chronic mania; dementia praecox; progressive deterioration	29	29	32	Marked increase of connective tissue; 18 follicles at one level; all immature, corpora lutea vera present	Ceased-a few months before death	Nil	Single
7	Delusional insanity	33	31	36	Excess of connective tissue; 6 follicles at one level, corpora lutea vera present	Menorrhagia for thirteen years, regular up to time of last illness	Three children, none living	Married twice
8	Primary dementia; Katatonica; dementia praecox Katatonica	28	29	30	Connective tissue increased, only 3 follicles at one level	Began at 14; irregular; ceased twelve months prior to admission	Nil	Single
9		30	30	37	Excess of connective tissue, only 2 follicles at one level	No history	Three children, last one born 6 weeks prior to admission	Married
10	Dementia praecox	25	25	30	Great increase of connective tissue; 12 follicles at one level, a few corpora lutea vera present	Regular	Nil	Single
11	Dementia praecox	17	19	26	25 follicles at one level; corpora lutea vera present	Normal during detention	Nil	Single
12	Dementia with increasing stupor	25	25	29	32 follicles at one level; some small corpora lutea vera present	Very irregular	Nil	Single
13	Dementia praecox	23	25	29	16 follicles at one level; small corpora lutea vera present	Began at 18, ceased just before death	Nil	Single
14	Dementia with increasing stupor	29	36	41	3 follicles at one level; some immature connective tissue; corpora lutea vera present	Did not occur during detention	Nil	Single
15	Dementia praecox	28	29	32	Connective tissue increased; 3 follicles at one level	No history	Nil	Single
16	Dementia praecox	24	26	30	6 follicles at one level; connective tissue increased; corpora lutea vera present	Occurred at irregular intervals during detention	One child living	Married
17	Dementia praecox	26	26	27	25 follicles at one level; connective tissue somewhat increased; corpora lutea vera present	Regular up to admission; did not occur during detention	One child, 4 years old, living	Married
18	Paranoid dementia, praecox	25	25	34	6 follicles at one level; small corpora lutea vera present	Dysmenorrhea during detention; ? previous history	Nil	Married
19	Dementia praecox	26	26	32	8 follicles at one level; connective tissue increased; corpora lutea vera present	Normal during detention	Nil	Married
20	Stuporous insanity	31	34	35	No follicles detected	Began at 13; history of regularity	Two miscarriages, two stillborn, none living	Married thirteen years
21	Confusional insanity	34	34	34	10 follicles at one level; excess of connective tissue; a good many corpora lutea vera present	Regular until three years before admission	Nil	Widow, married for three years
22	Epilepsy with dementia	18	31	36	108 follicles at one level; a few small corpora lutea vera present	Free and regular; last time fourteen days before death	No history, but there are abdominal striae present	Single
23	Cretin	Congenital	28	29	13 follicles at one level	Irregular	Nil	Single
24	Congenital imbecility minus epilepsy	Congenital	18	25	13 follicles at one level; connective tissue increased; corpora lutea vera present	Never occurred	Nil	Single
25	Imbecile with congenital epilepsy	Congenital	32	37	5 follicles at one level; connective tissue increased; large corpora lutea vera present	Regular till about three months before death	Nil	Single
26	Congenital imbecility minus epilepsy	Congenital	30	33	51 follicles at one level	Regular	Nil	Single
27	Congenital idiocy with epilepsy	Congenital	15	18	13 follicles at one level; no true corpora lutea noticed	Never occurred	Nil	Single
28	Congenital idiocy with epilepsy	Congenital	22	22	12 follicles at one level	Never occurred	Nil	Single
29	Epileptic imbecile	Congenital	35	38	Only a few isolated follicles present; numerous corpora lutea vera	Irregular	Abdominal striae present; no history	Single
30	Insanity with epilepsy	34	34	36	17 follicles at one level; some increase of connective tissue; a few corpora lutea vera present	Regular, menorrhagia	Nil	Single
31	Epileptic	12	23	24	204 follicles at one level	Regular	One child	Married 5½ years
32	Epileptic idiot	—	24	28	43 follicles at one level; true corpora lutea present	Regular; occurred three weeks before death	Nil	Single
33	Imbecility with epilepsy	Probably congenital	16½	23	41 follicles at one level; connective tissue increased; small corpora lutea vera present, but the spuria predominate	No date of onset; menorrhagia during detention	Nil	Single
34	Imbecility with epilepsy	Congenital	18	24	25 follicles at one level, connective tissue increased	Normal. date of onset not known	One child	Married
35	Imbecile	Congenital	21	24	96 follicles at one level; corpora lutea vera present	Amenorrhea; ? past history	Nil	Single
36	Imbecility with epilepsy	Probably congenital	18	21	45 follicles at one level; no true corpora lutea	Began at 19, ceased shortly before death: appears to have been regular	Nil	Single
37	Imbecile	—	24	21	6 follicles at one level; corpora lutea vera present, but the spuria exceed them in number	No history	Nil	Single
38	Epilepsy, feeble minded	Six weeks old	15	22	6 follicles at one level, no true corpora lutea vera present	Very irregular	Nil	Single
39	Idiocy with epilepsy	Congenital	34	39	123 follicles at one level, a few small corpora lutea vera present	Never occurred	Nil	Single
40	Idiocy with epilepsy	Congenital	10	19	3 follicles at one level, considerable increase of connective tissue; no corpora lutea vera	Irregular	Nil	Single
41	Insanity with epilepsy	22	22	27	31 follicles at one level	Profuse dysmenorrhea	Nil	Single
42	Stupor dementia praecox	17	17	33	Very few follicles detected; connective tissue increased	Regular	Nil	Single
43	Intelligence of low order dull and apathetic; epileptic, imbecile	2	11½	17½	11 follicles counted at one level, some dilated, corpora lutea vera present, but the spuria predominate	Ceased three years prior to admission	Nil	Single

No.	Nature of disease	Age at first attack	Age at admission	Age at death	Condition of ovaries	Menses	Pregnancies and results	Married or single
44	Insanity with epilepsy; typical insanity, epileptic temperament	21	23	26	500 follicles at one level, also a good many cystic dilatations of follicles; corpora lutea vera present	Began at 18, usually irregular	Nil	Single
45	Imbecile	Congenital	28	29	Only three follicles at one level; considerable increase of connective tissue; Corpora lutea vera present	Regular; began at 17	Nil	Single
46	Very slight intelligence	Congenital	18	21	36 follicles at one level; no true corpora lutea	Did not occur during detention	Nil	Single
47	Low type of imbecile	Congenital	18½	25	15 follicles at one level; corpora lutea vera present	Began at 15	Nil	Single
48	Organic brain disease, imbecile	16	16	18	Groups of small follicles, also dilated ones; no definite corpora lutea noticed	Never occurred	Nil	Single
49	Idiocy with epilepsy	Congenital	15	19	41 follicles at one level, some quite dilated with healthy-looking ova	Never occurred	Nil	Single
50	Congenital idiocy with epilepsy	Congenital	17	25	3 follicles at one level	Occurred about every three months	Nil	Single
51	Congenital idiocy minus epilepsy	Congenital	25	29	7 follicles at one level; corpora lutea vera present	Never occurred	Nil	Single
52	Imbecile	Congenital	18	25	274 follicles at one level; some small corpora lutea vera present, but the spurs predominate	Very irregular; ceased some time before death	Nil	Single
53	Insanity with epilepsy	19	35	41	2 immature follicles only; advanced involution, a few small corpora lutea vera present	Very irregular	Nil	Single
54	Imbecile	Congenital	22	31	42 follicles at one level; a few small corpora lutea vera	Began at 10 years	Nil	Single
55	Feeble-minded; more defective; dull and apathetic	35	36	36	6 follicles at one level, corpora lutea vera present	Began at 13; continued regularly	2	Married
56	General paralysis of the insane	42	43	44	Marked increase of connective tissue; a few isolated follicles only	No history obtainable	15	Married twice
57	Organic brain disease	35	35	37	6 follicles at one level, corpora lutea vera present	Once during detention	1	Married six years
58	Progressive general paralysis	38	38	41	Involution advanced, very few follicles present	Regular	One child	Married
59	General paralysis	34	34	38	25 follicles at one level, mostly immature; numerous small corpora lutea vera	No history; absent during detention	Four children, all living	Married
60	General paralysis	43	43	43	11 follicles at one level, a good many corpora lutea vera	No history, absent during detention	No history; abdominal striae present	Married
61	General paralysis, beginning with menacal symptoms	38	40	41	Involution advanced, only one or two isolated follicles seen	No history obtainable	Several miscarriages	Married
62	General paralysis	36	36	38	4 follicles at one level; some large corpora lutea vera present	Twice during detention	1	Married four years
63	General paralysis	36	38	43	Advanced involution, only 2 follicles noticed	Did not occur during detention	5	Married fifteen years
64	General paralysis	?	21	24	40 follicles at one level; corpora lutea vera present	Nothing known	Nil	Single
65	General paralysis of the insane	40	40	41	Involution advanced; 5 follicles at one level, mostly degenerating, numerous corpora lutea vera	Frequent and excessive	3; first and second miscarried, third died soon after birth	Widow
66	General paralysis	27	29	30	Only 2 follicles at one level	Regular, began at 15, ceased shortly before death	Nil	Single
67	General paralysis	26	26	26	23 follicles at one level; a few corpora lutea vera present, but the spurs predominate	Did not occur during detention	Nil	Single
68	General paralysis	35	35	36	Both ovaries consist of a narrow band of normal stroma enclosing a mass of corpus luteum tissue; in the normal tissue there are 12 follicles at one level	No history obtainable	Abdominal striae present	Married
69	General paralysis	39	39	41	Involution almost complete	Occurred only once during detention, began at 15	?	Married one year
70	Juvenile general paralysis	19	19	20	160 follicles at one level, some large corpora lutea vera present	Regular until just before admission; began at 15	Nil	Single
71	General paralysis	43	43	44	Advanced involution; no follicles detected	No history obtainable	Thirteen children	Married
72	General paralysis, demented type	35	35	38	Involution advanced, 11 follicles at one level, corpora lutea vera present	Regular till eighteen months before admission	Nil	Single
73	General paralysis	37	38	39	34 follicles at one level, some dilated; corpora lutea vera present, but the spurs predominate	Ceased three years prior to admission	One child living	Widow *
74	Melancholia	44	44	44	Only 3 follicles at one level	Occurred during detention	Six children living	Married
75	Melancholia; suicidal at an early stage	41	41	46	A few isolated follicles present; involution almost complete; a few corpora lutea vera present	Three times during detention	Nil	Married twenty-one years
76	Melancholia	39	39	39	Only two follicles at one level	Began at 16; ? regularity	Nil	Single
77	Chronic melancholia	38	41	44	5 follicles at one level; corpora lutea vera present	Regular during detention; occurred five days before death	History defective	Married
78	Melancholia	26	29	33	9 follicles at one level; marked increase of connective tissue	Began at 14; history of regularity	Three	Married
79	Melancholia	34	36	40	8 follicles at one level; excess of connective tissue; corpora lutea vera present	Began at 14; Fairly regular	Seven; last child born six weeks prior to admission	Married
80	Melancholia agitata	27	27	27	3 follicles at one level; connective tissue increased; some small corpora lutea vera present	Did not occur during detention	Nil	Single
81	Melancholia	28	28	37	Involution almost complete; 3 follicles at one level; corpora lutea vera present	Regular	Seven; three children living	Married
82	Melancholia	24	34	39	Only 1 follicle noticed	Regular and profuse	Nil	Married
83	Melancholia	35	36	36	4 follicles counted at one level; a few dilated ones; corpora lutea vera present	History of irregularity	One child living, 8 years old	Married
84	Puerperal mania, which became chronic	31	34	41	Advanced involution; 6 follicles at one level; some large corpora lutea vera present	Regular	Four; three children living	Married
85	Mania	41	42	43	Advanced involution; only a few isolated degenerated follicles found	No history	Nil	Married
86	Mania with epilepsy	?	27	28	Excess of connective tissue; 3 follicles at one level	Not regular; occurred three times during nineteen months' detention	Nil	Single

No.	Nature of disease	Age at first attack	Age at admission	Age at death	Condition of ovaries	Menstruation	Pregnancies and results	Married or Single
87	Mania with epilepsy	20	23	30	3 follicles at one level	Regular; occurred one month before death	Nil	Single
88	Mania with imbecility	?	22	32	Connective tissue increased; 32 follicles at one level; corpora lutea vera present	Dysmenorrhoea; ? commencement	Nil	Single
89	Mania with epilepsy	22	22	24	21 follicles at one level; corpora lutea vera noticed	Ceased two months before admission	Nil	Single
90	Mania	33	33	33	6 follicles at one level; connective tissue increased; corpora lutea vera present	No history obtainable	One child	Married
91	Recurrent mania	29	29	29	5 follicles at one level; interstitial connective tissue increased	No history obtainable	Nil	Single
92	? Acute mania	21	21	21	8 follicles at one level; corpora lutea vera present	Regular	Nil	Single
93	Mania	?	16	40	3 follicles at one level; some large corpora lutea vera present	Irregular; scanty	Nil	Single
94	Acute post-puerperal mania	26	26	30	39 follicles at one level; connective tissue increased	Did not occur during detention	One child born three weeks prior to admission	Married
95	Died after recent pregnancy	24	24	24	5 follicles at one level; some small corpora lutea vera present	Regular	Two	Married
96	Consciousness clouded, confusion, hallucinations	22	26	34	10 follicles at one level; no dilated ones; corpora lutea vera present	Nil noted	youngest thirteen months old	Married
97	Degenerate in mind and body	23	23	23	40 follicles at one level; connective tissue increased; mostly degenerated	Began at 16	Nil	Single
98	Melancholia	37	37	37	30 follicles at one level; connective tissue increased; several corpora lutea vera present	Once during detention	Nil	Single
99	Mania	22	23	34	8 follicles at one level; corpora lutea vera present	No history obtainable	Nil	Single
100	Epileptic	38	38	41	Involvement advanced; very few follicles present; a few corpora lutea vera present	No history	Nil	Single
101	Epilepsy with mania	Two previous attacks	24	42	Involvement advanced; very few follicles; a few corpora lutea vera present	No history	Nil	Single

TABLE II.—CONTROL OVARIES OF PERSONS NOT AFFECTION WITH MENTAL DISEASE.

No.	Age	Cause of death	Condition of ovaries
A	30	Corrosive acid poisoning	Graafian follicles not numerous, 9 at one level; connective tissue much increased; numerous corpora lutea vera present
B	33	Cirrhosis of liver	12 follicles at one level; a good many degenerate follicles which contain no ova; numerous corpora lutea vera; connective tissue increased
C	4	Extensive burning	Innumerable follicles present, some of which are much dilated; no corpora lutea of any description noted
D	4 days	Pneumonia	Innumerable follicles, a number of which are dilated; no corpora lutea of any description
E	25	? Poisoning	Follicles at all stages of development; 81 at one level
F	7 months	Catarrhal gastritis and enteritis	Innumerable follicles, many dilated ones; no corpora lutea of any description noticed
G	32	Heart failure; chronic interstitial nephritis	No ova detected; involution appears complete; numerous corpora lutea vera present
H	17	Heart failure; diabetes	454 follicles counted at one level, some of which are considerably dilated; a few corpora lutea vera and spuria present
I	35	Cerebral haemorrhage; chronic interstitial nephritis	Very few follicles present, and these are mostly degenerating; increase of connective tissue and thickening of blood-vessel walls; many corpora lutea vera present
K	24	Diabetes	171 follicles at one level; connective tissue somewhat increased and walls of blood-vessels thickened; corpora lutea vera and spuria present
L	31	Carcinoma recti	78 follicles at one level; corpora lutea vera and spuria present
M	35	Chronic empyema	14 follicles counted at one level; corpora lutea vera present
N	28	Exophthalmic goitre	10 follicles at one level; corpora lutea vera present

luteum in relation to pregnancy is one of the most extraordinary crazes that has crept into medical belief."

#### *Results of the Histological Examination*

As it was impossible in so large a number of cases to estimate the absolute number of follicles present in each ovary, I adopted as a method of comparison the plan of counting the largest number present at any one level throughout the sections examined. I append here a tabulated statement of each case, with the results summarized, and give below a summary of comparative results according to age and mental disease.

*Dementia Praecox*—In this group the ovaries of all those who had reached the age of thirty showed signs of early involution, marked by an increase of interstitial connective tissue, and a great scarcity of Graafian follicles. Even in those much below this age, there was a distinct diminution of the follicles, as compared with a normal woman of the same age. As an instance, the greatest number of follicles at one level, found in one case aged nineteen, at death, was fifty-nine, whereas in a control ovary from a girl aged twenty-four, there were 171 follicles at one level; and in another aged seventeen, there were 454 counted at one level.

*Imbecility With or Without Epilepsy*—These ovaries did not present a uniform type. Some quite young persons showed early involution, while in others there were a proportionately large number of follicles. In one case, for instance, of congenital imbecility with epilepsy, aged thirty-nine at death, 123 follicles were found at one level, and no true corpora lutea.

*Melancholia*—(Many of these cases are probably mania depressiva, as true melancholia is met with at the involutorial period.) Here we find a definite diminution of follicles. The greatest number at any one level was forty, in the ovary of a woman aged twenty-three\* and a number of these were undergoing cystic degeneration, and showed no trace of an ovum. In the majority of cases the number found at one level ranged from three to fifteen, and the stroma showed a marked increase of fibrous tissue, and some thickening of the walls of the blood vessels.

*Mania*—In all these cases a marked diminution of follicles was found, the largest number at any one level being thirty-two, in a woman aged thirty-two.

*General Paralysis*—Here there was likewise a decrease in the number of follicles, the greatest number in any one case at any one level amounting to forty, with the exception of a case of juvenile general paralysis, aged twenty, where the largest number amounted to 160 at one level. There was a marked increase of fibrous tissue, and thickening of the walls of the blood vessels, some of which were almost obliterated.

#### *Conclusions*

It would appear from the above results that where there is disease of

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\*It is probable this was a case of dementia praecox.—F. W. M.

the brain, or mental incapacity associated with it, the power of the individual to reproduce her kind, if not absolutely cut off, is at least diminished, and in most cases an early cessation of the ovarian functions seems to take place. These facts argue that there is an intimate relation between the ovary and the brain, and confirm Cenì's statement on this point.

I do not in this paper intend to discuss in full as to whether the ovary plays a direct part in the internal secretion of the body, or whether its influence is only an indirect one. With regard to its histology, however, I can say that there is no part in the structure of the human ovary that leads me to suppose it can exercise a secreting function, unless it be the Graafian follicle itself. Neither the corpus luteum verum, nor the corpus luteum spurium show in their composition anything resembling epithelial cells, and it is these two bodies, more especially the atretic follicle, which in the lower animals are credited with the function of secretion. After a careful study of all the ovaries, normal or otherwise, that came under my notice, I can only confirm Fraenkel's statement that in the human ovary there are no groups of epithelioid cells corresponding to those found in the rabbit and other animals, and representing the "glande interstitielle" of Limon.

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#### ADDENDUM

By F. W. MOTT, F. R. S.

Before the outbreak of the war Dr. Laura Forster handed me the paper which has just been read. Unfortunately, she immediately left England and I was unable to communicate with her. But for this I should have suggested some modifications and additional microscopic investigations of the sections which she has prepared with so much diligence. I must publish the paper as it was written, for her death has been recently announced, which is greatly to be regretted, as she was an earnest worker, for whom I had great respect. I thought it desirable, however, from a study of the great number of sections made by Miss Forster to write a commentary, which, had she lived, I would have asked her to consider with a view to its partial or complete embodiment in her paper.

This investigation is beset with many difficulties, and I think that if fewer cases, with perfect notes, had been selected more convincing results would have been obtained. Still the large number of cases studied permits some generalizations to be made which a smaller number would not do. Among the difficulties which Miss Forster had to contend with was the possibility of variable diagnosis of the mental disease by the medical officers in charge of the cases. Again, her observations show that chronic diseases of long standing—e. g., nephritis, chronic endocarditis, and diabetic cirrhosis—may cause follicular degeneration and fibrotic atrophy. Lastly, it is difficult to make a complete histological examination of the ovary; for

owing to its structure, the paraffin method cannot be employed for serial sections with advantage, and it was found that the only satisfactory mode of procedure was to embed the material in celloidin. The blocks were cut and each section was laid out in series on glass plates, examined with a low power objective, and then, if a particular follicle was required to be studied, the series containing it was stained and mounted.

Nevertheless, taking into consideration the large number of ovaries thus carefully examined by Miss Forster, and fully admitting the difficulties of drawing certain conclusions owing to the complicating causes mentioned, I am of opinion that her work establishes the fact that there is a correlation between certain types of mental disease and morbid changes in the ovaries. I have not liked to add my own views to her communication without consulting her. I have, therefore, given it as she handed it to me. If it had been possible, I should have asked her to more carefully consider the following points in relation to the morbid histology of the ovaries and their possible association with certain types of mental disease. The corpora lutea vera she very properly distinguishes from the corpora lutea spuria, or, as I should prefer to name them, the corpora atretica. The former are the result of the maturation and rupture of normal Graafian follicles, the latter are the result of invasion of a degenerate follicle by the stroma of the gland. It is permissible to assume that the existence of a large number of the former of large size is evidence that for some considerable time during the possible reproductive life of the woman healthy follicles were maturing and rupturing. Consequently a comparison of the relative numbers and size of the corpora lutea vera in relation to (a) the age of onset of the mental disease and age at death, associated with (b) history of menstruation when obtainable would have been valuable. Some idea might be gathered, therefore, when the normal ovarian function of follicular maturation ceased, and how far this could be connected with, or be considered coincident with the onset and progress of the mental disease.

But suppose the follicles, instead of bursting, undergo degeneration with their contained ova and form the corpora atretica, we then have evidence of a morbid condition, consequently the relative numbers of the corpora atretica to (a) corpora lutea vera, (b) the age of onset of the mental disease and age at death, would afford some indication when normal follicular maturation ceased (if it ever occurred) and how far the appearance of the degenerative follicle could be connected with, or considered coincident with, the onset and progress of the mental disease. The examination of a large number of the sections prepared by Miss Forster has impressed me with two facts, viz., that there is evidence to show that the normal maturation of the follicle and formation of the corpus luteum verum tends to cease and be replaced by the degeneration of the follicle with the onset of certain types of mental disease. I will, therefore, consider a little more fully the characteristics which serve to distinguish the degenerate or

atretic follicle from the true corpus luteum, and subsequently I will refer to the particular cases which illustrate the premise I have stated.

(1) The atretic or degenerate follicle exhibits no indication of rupture to the exterior.

(2) The follicular epithelium forming the zona granulosa and discus proligerus instead of hypertrophying, degenerates, separation from the wall and fragmentation occurs, the chromatin substance instead of appearing as a distinct nucleus is seen as fine points in the cytoplasm, much smaller than the nucleus. They lose their basophil staining reaction, break up eventually and become unrecognizable as cells, finally disappearing altogether. Hemorrhage into the degenerate follicles is very liable to occur.

(3) The ovum is retained in the follicle but undergoes degenerative changes; it may lose its regular circular shape, the zona pellucida persisting. The germinal vessels and the germinal spot lose their circular form and have an irregular appearance; the ovum may shrink away from the zona pellucida, and finally it may be invaded by cells.

(4) The connective tissue wall does not proliferate to form a network among the epithelial cells, as occurs in the true corpora lutea, and there is usually no ingrowth from the theca until the epithelial cells are in an advanced stage of degeneration or have altogether disappeared.

Such degenerative changes may occur in all stages in the development of the follicle, and not merely in the fully formed follicle that has failed to rupture. Atretic follicles may continue for a time as cysts which remain filled with fluid.

Heape has shown that in the rabbit two kinds of degeneration prevail; in the one kind the changes first affect the follicle, then the ovum; in the other the ovum is first affected and the follicle afterwards. Heape interprets the latter change as evidence that the ovum is not capable of assimilating the nourishment brought to it. The more usual cause of degeneration in immature follicles is lack of sufficient nutriment or of nutriment of the requisite kind. (Marshall, "Physiology of Reproduction.")

I have examined sections from the following cases on the lines indicated:

(1) A cretin, S. B., aged twenty-eight on admission to Leavesden; died at the age of twenty-nine. No corpora lutea vera seen; atretic follicles, a few immature follicles, and dense fibrous tissue. In the left ovary, in addition, the organ is the seat of a large blood cyst.

(2) A. B., aged eighteen on admission to Leavesden; age at death twenty-one. Never menstruated. No sign of mature Graafian follicles, a few atretic follicles, very few small corpora lutea, paucity of immature ova.

(3) M. T., admitted to Leavesden, at the age of eighteen, suffering with idiocy and epilepsy; never menstruated; died at the age of twenty-two. Excessive fibrosis; many atretic follicles in various stages. A Graafian

follicle of small size with discus proligerus, and ovum with zona pellucida observed. The ovum shows the first stage of degeneration. There is a vacuolation in the place of the germinal vessels and germinal spot.

(4) A. S. P., aged twenty-three at death. Dementia praecox. Died of tuberculosis. Interstitial connective tissue much increased. Very few immature follicles. Atretic follicles, hemorrhage into one of them. One ovum in a dilated follicle seems to be dividing into segments; the zona pellucida appears normal. There is a hemorrhage into the cavity of the follicle; it no longer contains any epithelial lining cells. Corpora lutea vera, a few present.

(5) E. M. S., aged thirty at death. Post-puerperal mania. There has been some chronic inflammatory process, for the ovarian tissue seems quite encapsulated in connective tissue. A small Graafian follicle seen with normal ovum; discus proligerus and zona granulosa.

(6) B. W., aged thirty-three at death from cirrhosis of liver and ascites. Charing Cross Hospital. The ovaries are large and weigh respectively: right, 13.9 grm.; left, 20.2 grm. The increase in size is due to a number of degenerate follicles of varying size; there are also a number of corpora lutea vera. There is an increase of dense fibrous tissue, which, by its contraction around the cysts, gives a nodular appearance to sections of the gland. There are only a very few immature follicles. I have seen several ovaries of chronic drunkards presenting this appearance. The corpora lutea vera may be regarded as evidence of normal follicular maturation in earlier life before the effect of the alcohol had produced the morbid change and degeneration.

(7) E. F., admitted to Boxley for melancholia at the age of twenty-nine; died aged thirty-three. Few corpora lutea vera; great increase of connective tissue; many atretic follicles.

(8) A. M., admitted to Boxley at the age of twenty-two; died at the age of thirty-one; right ovary, 3.7 grm.; left ovary, 3.7 grm. The section shows fibrotic atrophy in a remarkable manner. There are only a few scattered immature follicles. Atretic follicles are seen in all stages of degeneration. There are hardly any corpora lutea vera present in either ovary. There is a great increase of connective tissue and some thickening of the vessels.

(10) E. T., aged nineteen, admitted to Long Grove with juvenile general paralysis; died at the age of twenty. Menstruation ceased prior to admission; previously regular. Crowds of follicles in both ovaries. A few rather large corpora lutea. A number of atretic follicles.

(11) O. H., admitted to Horton at the age of nineteen for dementia praecox; died at the age of twenty-six. Right ovary, fourteen grm.; left ovary, 9.5 grm. Although the ovaries are large there are only a few small

corpora lutea. The glands are very vascular and the vessels are dilated and congested. There are numbers of atretic follicles in all stages of degeneration and subsequent fibrotic changes.

(12) L. L. N., admitted to Manor Asylum. Diagnosis, mania with epilepsy, at the age of twenty-two; died at the age of twenty-four. Menstruation ceased two months before admission. Right ovary, 3 grm.; left ovary, 2.5 grm. No corpora lutea vera seen. Intense congestion. Hemorrhage into all the follicles. Zona granulosa separated and fragmented. Very marked congestion of discus proligerus, probably the result of status epilepticus. It may be that the eongestive stasis of epilepsy would cause follicular destruction.

Assuming that the degeneration of the follicles may arise from two causes: (1) Nutritional, depending upon the quality and quantity of the blood supply to the organ; (2) germinal—the speeific vitality of the follicle and especiially of the ovum, it is desirable in any future investigation to study particular methods by which the finer histological changes in the ovum can be recognized, so as to determine whether in certain forms of insanity occurring in adolescence, e. g., dementia præcox, a primary degeneration of the ovum occurs, recognizable in the immature follicles.

#### EDITORIAL COMMENT

The presentation of the preceding paper to the readers of DEMENTIA PRÆCOX STUDIES needs no apology. In previously published abstracts and reviews the editor has shown the effect of various forms of infection on the testicle and the condition of the testicle in the mentally disturbed.

It is enough to repeat here the more important conclusions:

1. The action of different infectious febrile and afebrile diseases upon the size, weight, and histologic integrity of the testicle is unexpectedly different, but uniform in each case.
2. In the great proportion of dementia præcox patients the seminiferous tubules, at the time of commitment, are devoid of living spermatozoa, and are smaller than in normal boys of the same age, height, weight and race.

For the convenience of readers the following bibliography is republished:

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An institution fully provided with facilities for scientific work will naturally attract and hold the best class of medical assistants—the student and investigator—because they recognize that association with the work of such a hospital will result in advancement along professional lines.

Vol. VI. *Report of Central Indiana Hospital for the Insane.*

# STUDIES OF ENDOCRINE ORGANS OF DEMENTIA PRAECOX

By M. KOJIMA, I. J. N. (Tokio)\*

## *Introduction*

The fact that dementia praecox commences at puberty or in early adolescence may be associated in some way with perverted function of sexual glands. The histological changes in the brain are generally regarded as insufficient evidence to account for the signs, symptoms and progress of the disease. There is reason, from the results of investigations of endocrine organs, for supposing that these organs are associated functionally with the sexual glands and the metabolism of the nervous system. The endocrine organs, especially the sexual glands by internal secretion may influence not only the secondary characters, but the mental character.

Many authors have studied the changes of endocrine organs in dementia praecox. Here I give a brief review of recent literature concerning this subject.

In regard to the changes of thyroid in dementia praecox Amaldi reported a functional insufficiency in two out of four cases. Benigni and Zilocchi found marked sclerosis in one case. Ramadier and Marchand found, in a female case aged seventeen, marked sclerosis, and the gland weighed five grm. In the other four cases they found more or less sclerotic changes, and atrophy of vesicles and great variation in quantity of colloid while in one case no changes were observed. On the other hand, Parhon and others did not find any sclerotic alterations, but marked distention of colloid in the vesicles. According to the results of most authors the weight of the thyroid was often lighter than normal. As stated above, the changes of thyroid in dementia praecox are not alike in all cases, viz., in some cases an alteration of hyperfunction, while in others sclerosis connected with hypofunction.

In regard to the changes of parathyroid, Parhon and Ureehie found a large number of cyanophil cells in one case, while in the other the gland was in a state of rest.

According to Laignel-Lavastine the pituitary body presents no alterations. Benigni and Zilocchi reported, on the contrary, some alteration in one out of two cases.

Laignel-Lavastine observed a hypertrophy of the cortex adrenals, with a tendency to form adenomatous nodules, and an increase of pigment in the zone reticularis. In a case of Benigni and Zilocchi's the cortex was altered.

Parhon and Ghiorghiani have studied the menstruation of 216 female cases, of which thirty-five were dementia praecox. In twenty-five out of thirty-five cases they found amenorrhea. They consider that ovarian conditions are frequent in dementia praecox, and that they are connected with mental disorders and not with age.

\*Presented to the Royal Medical Society, March 13, 1917, and published in the Proceedings, 1917, Psychiatric Section, x, p. 88-100.

According to Marie and Dide, there was no alteration in the testes in dementia praecox. On the contrary, Laignel-Lavastine and Vigouroux have found sclerosis with diminution of interstitial gland in several cases. Parhon, Obregia and Urechia found that in the first case the testicle of one side was sclerotic, the interstitial cells were diminished, and the spermatogenesis was nearly absent, while in the testicles of the other side the interstitial cells were numerous, with abundant lipoid, but the spermatogenesis was scarce. They found in the second case equal alteration of sclerosis, an absence of spermatogenesis, but no changes of interstitial cells.

The above is a brief sketch of the results observed by many authors. These changes are multifarious and may not be the effect of mental disorders, because in most cases of the insane complications are found, and these, especially chronic diseases, may cause several changes in the endocrine organs.

During my study in the Pathological Laboratory, Claybury Asylum, under the guidance of Dr. Mott, F. R. S., to whom I desire to express my cordial thanks for his kindness, I was present at a great many post-mortem examinations of the insane, including five cases of dementia praecox, of which two were male and three female. In the case of a male and two females, this condition was combined with chronic tuberculosis, and a male and a female died from broncho-pneumonia after a short illness.

Microscopic examinations of the endocrine organs of these two cases were made, and description follows:

#### METHOD

The materials were preserved in ten per cent formalin, except the adrenals, which were fixed in Müller-formalin. Some preparations from the pineal glands, thyroids and ovaries were embedded in celloidin, the others were embedded in paraffin. The staining methods used are hematoxylin-eosin, Van Gieson's stain, Schiarach or Sudan III, hematoxylin and Heidenhain's iron-hematoxylin.

#### *Remarks on Case I*

E. S., aged twenty-four, single; former occupation a beer bottler. Admitted to Claybury Asylum on March 28, 1914. First attacked at the age of twenty-three. Clinical diagnosis, dementia praecox. Died on February 19, 1915.

According to the certificates the patient gesticulates and poses. He states that he ought to be in the secret society, but he also states that he does not know what the secret society is. He states that the attendant is his "daddy" and that he came here to see him. The mother stated that the patient had been talking funny for a year; six weeks ago he gave up his job to better himself. Later he went back and first sacked the foreman and later all the staff. He said he was a millionaire and would make the mother a titled lady.

*State on Admission*—Good physique, fair nutrition. Expression is confused; attitude is restless. Respiratory and circulatory organs show nothing special. Teeth carious. Reaction of urine, acid; its specific gravity is 1.035. Slight, fine tremor of hands. Pupils are medium size, reaction normal. Plantar flexion normal. Knee-jerks are brisk.

*Mental Condition*—He often elevates his eyebrows with a restless, starting expression. He reacts slowly to questions. There is marked impairment of memory. His conversation is rambling. His method of expressing himself is often slow, and there is a tendency to repeat phrases. His remarks are often foolish and incoherent. He is unable to realize his position.

*Progress of the Case (March 30, 1914)*—He is weak-minded, and says he wishes to be a doctor. He wishes to join a secret society so that he can better himself. He is anxious to discover a lady of title who will marry him. He is in good health and condition. He does not improve mentally; is dull and apathetic. He was unable to interest himself in anything.

On February 18, 1915, he was put to bed with temperature 101° F. The next day the temperature was 103° F. His pulse was very poor. He failed gradually and died that day.

*Autopsy*—(*Made by F. W. Mott, Major R. A. M. C. (T.), M. D., F. R. S.*)—A male, fair physique, nutrition good; post-mortem rigidity in hands and arms; lividity on dependent parts of hands and arms; no bruises nor bedsores; no external mark of syphilis.

The skull *nil*. Dura and pia mater, nothing noticeable. Pia-arachnoid strips with difficulty. The convolution is complex. No general nor local softening. The pituitary body is small; weighed 0.57 grm. The pineal gland is larger than normal; weighed 0.17 grm. The thyroid is large and pinkish, and weighed 18.3 grm.

The thorax shows normal appearance. The ribs are brittle; the cartilage is completely ossified. The posterior border and apex of right pleura are adherent; there is no fluid. Left pleura is free; no fluid. Bronchi are congested. Right lung is emphysematous. The apex of lower lobe of left lung is solid, with red hepatization. Heart muscle firm. Aortic and mitral valves are competent. Coronary arteries patent. Aorta, about three-fourths inch in diameter at the ascending portion. Thymus persistent; weighed 6.5 grm.

The liver is congested and fatty. The gall-bladder contains dark bile; no gall-stones. The kidneys are pale; capsules strip readily. The right adrenal is distinctly yellow; weighed 8.8 grm. The left adrenal shows hemorrhage in medulla; the cortex is less yellow than normal; weighed 10.7 grm. Intestines and other organs show nothing of note.

The Wassermann reaction of the serum and the spinal fluid negative.  
*Cause of Death*—Broncho-pneumonia.

#### *Microscopic Examination*

- (1) *The Thyroid Gland*—The vesicles vary considerably in size and

are filled with colloid, which is stained delicate pink by hematoxylin-eosin. There is marked increase of intervesicular connective tissue. The epithelial cells are generally flattened; their cytoplasm contains fine eosinophil granules. In some vesicles a debris of cells is mingled with colloid. There is some thickening of intima of arteries.

(2) *The Parathyroid Glands*—The three external parathyroids look compact under low power, and a great many watery, clear cells, and a few oxyphil cells are seen. The cytoplasm of the clear cells is not stained by eosin, while the nuclei are stained distinctly by hematoxylin. Some of the cells are large. There is no follicular arrangement of the cells.

(3) *The Thymus*—The remainder of the parenchyma is embedded in adipose tissue. The cortex is approximately reduced. A few Hassall's corpuscles, which have undergone hyaline degeneration, are seen, enclosed in the epithelial cells of medulla.

(4) *The Pituitary Body*—The *pars glandularis* is compact. The eosinophil cells are plentiful in the middle. Towards the periphery their number is reduced and the cyanophil and principal cells are on the contrary, increased. The connective fibers are increased throughout. A few follicles are seen. The *pars intermedia* is somewhat thickened. In the center there is a slight amount of hyaline substance, which is stained light red by eosin. Nothing noticeable in the *pars nervosa*.

(5) *The Pineal Gland*—In the hind part of the gland are seen a small cyst and brain stand, which varies in size and shape. On the whole the section shows complete involution.

(6) *The Adrenals*—The cortex is somewhat reduced in thickness. A few cortex cells contain abundant lipoid substance, which is stained red by Scharlach or Sudan III, but in the majority this substance is greatly diminished.

(7) *The Testes*—The connective tissue between the tubules is thickened. The interstitial cells are numerous and contain much lipoid substance, which is stained by Scharlach. Most of Sertoli's cells do not contain lipoid. There is very slight spermatogenesis.

#### *Remarks on Case II.*

N. D., female, aged thirty-three, single; former occupation, a book-folder. Admitted to Claybury Asylum on December 7, 1904. First attack when aged twenty-three. Clinical diagnosis, dementia praecox. Died on November 10, 1914.

According to the certificates the patient says that today is about November 18, and that she does not know the day of the week. When asked if she is still tired of life she replies that she is sorry for her past sins and wishes to be good.

She went off quite suddenly, became strange and depressed, whereas she was previously bright and cheerful. She tried to commit suicide by

throwing herself into the doek. She was taken to the St. George's-in-the-East Infirmary by a police constable and subsequently transferred to the asylum. A sister at the infirmary says that the patient told her that she was tired of life and had been refusing food. She is very depressed and confused in manner.

Before she had the attack *her periods stopped*. She suffered from anemia and had taken Bland's pills for her menses. After she came to the asylum she complained of pain and recurrence of periods. She recognized her sister, but her sister and her friends noticed that she was quite irresponsible. Occasionally she would smile. Her expression had gone and her hands were cold.

During the first eighteen months her friends had hoped that she would get better, and she looked forward to it. Her sister came one Sunday and instead of finding her in the corridor she was in the ward and a change was noticed. Since then her mind has become worse.

*Progress of Case (December 12, 1904)*—She is suffering from melancholia. She is dull and disinclined to answer questions. States she attempted to drown herself but was saved by a policeman. Admits being tired of life, and that voices speak to her. She does not know where she is; thinks it is Dartford. Says her maternal grandmother was in Dartford Asylum, where she died; also her paternal aunt is in an asylum. She gazes vacantly about her; is in poor health and condition. November 2, 1911: She is the subject of chronic melancholia. She wanders about in an aimless manner, taking no notice of what occurs around her. There are suicidal tendencies. She rarely speaks. Habits faulty. She is in good health and condition. Her mental condition became worse, and she died on November 10, 1914, after a short illness.

*Autopsy (made by F. W. Mott)*—A female, well nourished, physique good. Some post-mortem lividity; no external marks of bruises or bed-sores; no deformity nor local atrophy; no external marks of syphilis.

The skull is normal. The dura and pia mater have a normal appearance. The pia-arachnoid is also normal. The subdural and subarachnoid spaces show nothing special. The cerebrum is symmetrical. No special marks of brain. The pituitary body is comparatively small weighed 0.4 grm. The pineal gland is pink, weighed 0.15 grm.

The right and left pleurae show no adhesion nor fluid. The bronchi are congested; the bronchial glands show no swelling. The thyroid is small and pink, weighed 7.7 grm.

The right lung shows patchy broncho-pneumonia, especially of the upper lobe, and to a less degree of the lower lobe. Most of the lower part of the left lung is solid, with congestive edema of the whole lung. All parts float in water. Both lungs have the appearance of having been quite healthy before the onset of pneumonia. The heart is small; the valves are normal; the muscle has a rather dark edematous appearance. The aorta shows

hypoplasia; it is only three-fourths of an inch in diameter just above the sinus of Valsalva.

The liver is congested, normal in size. The spleen is also congested. There is nothing of note in the kidneys and intestines. The adrenals are small, the right weighed 2.8 grms., while the left weighed 3.4 grm. The uterus is infantile; ovaries small and atropied, the right weighed 1.8 grm. and the left 2.7 grm.

*Cause of Death*—Broncho-pneumonia.

MICROSCOPIC EXAMINATION

(1) *The Thyroid Gland*—Many of the vesicles are very large, while some of them are small. Generally the vesicles are distended with colloid, which is stained delicate pink by hematoxylin-eosin. In the colloid many vacuoles are seen. The epithelial cells are distinctly flattened. Their nuclei are also flat and are stained uniformly dark by hematoxylin.

(2) *The Parathyroid Glands*—The whole section is compact. The eosinophil cells exceed in number the cyanophil cells. There are some follicles, which contain hyaline substance, stained light red by eosin. All the cells have follicular arrangements. The interfollicular connective tissue is somewhat increased.

(3) *The Pituitary Body*—The *pars glandularis* is generally congested. There are abundant eosinophil cells. The cyanophil and principal cells are far less in number than the former. Follicles, which contain hyaline substance, are seen here and there. A great deal of hyaline substance is seen in the cleft. The *pars intermedia* shows nothing remarkable, but in the *pars nervosa* many droplets of hyaline substance are seen.

(4) *The Pineal Gland*—The interlobular tissue is markedly thickened. Sand particles, varying in size and shape, are seen here and there.

(5) *The Adrenals*—There is a striking diminution of lipid substance in the cortex cells. In many parts of the left adrenal the connective tissue fibers are seen running towards the medulla through the cortex, from the capsule. The medullary seems to be reduced in thickness.

(6) *The Ovaries*—In the series of sections of the right ovary there are seen a few corpora candidantia and two corpora albicantia. A few atretic follicles are seen. In the middle a small corpus luteum with a few lutein cells are seen. The left ovary contains a few corpora candidantia and a corpus albicans; a few atretic follicles are seen. On the whole it shows the appearance of undergoing an early involution.

SUMMARY

The thyroids have an entirely contrary appearance in the male and female, viz., a tendency to hypofunction in the male and to hyperfunction in the female.

The glands are, on the whole, small, especially in the female. In the

male the parathyroids contain watery, clear cells and a few eosinophil cells, and in the female, on the contrary, many eosinophil cells.

The sexual glands and adrenals were very small in the female. The diminution of lipoid substance in the cortex cells of adrenals may be due to the acute disease, as stated by Elliott.

Striking changes are seen in the sexual glands, i. e., very slight spermatogenesis in the testes, and appearance of undergoing an early involution of ovaries.

In Case II the menses were irregular, as noted in the history.

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We must be on our guard against the spiritless domination that is likely to arise in educational and investigational endeavor when it becomes formal, and be aware of those tendencies that confuse red-tape and obstructive duties with administration. An enterprise is not commendable merely because it is "regular" and smooth running. We may easily lose all useful sense of proportion in the effort to regimentalize everything and to reduce it to what we like to call "a system." It is a sad case if personality is ever subordinated to regularity. A man is always more important than a rule.

It is a gross mistake to suppose that management systems usually applicable to a factory can be applied to a college or a university, or to an experiment station or a research laboratory, and for the very good reason that the products are wholly unlike—manufactured goods in the one case, human souls and scientific truth in the other. So also are the methods of procedure unlike—time-work and a measurable output in the one case, study, reflection, mental recuperation, inspiration, soul-service in the other.

L. H. BAILEY.

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Then again the too exclusive study of one subject always tends to force the mind into a special groove—into a line of thought so deeply tinged with the prevailing teaching of the subject, that any suggestions which arise contrary to such teaching are apt to be dismissed at once as heretical and not worthy of further thought; whereas the same suggestion arising in the mind of one outside of this particular line of thought may give rise to new and valuable scientific discoveries.

Nothing but good can, in my opinion, result from the incursion of the non-specialist into the realm of the specialist provided that the former is in earnest.

WALTER HOLBROOK GASKELL.

## DEMENTIA PRAECOX IN A WAR HOSPITAL

By HERBERT J. NORMAN

This is a condition which, even in ordinary times, gives rise to much discussion. Patients exhibit symptoms which are so varied that it is difficult to know whether a particular case can rightly be included in one of the categories of this disease. Where there is still a flux of opinion, much is left to be decided in accordance with individual predilection. Yet there can be no doubt that, however much we may criticize Kraepelin's description or his claim to priority, he has done a very great deal towards elucidating a difficult subject. Great as the difficulties are in ordinary times in coming to a satisfactory diagnosis, they are still further increased at present. Mention has been made of the confusional state so common in the patients exposed to severe stress; and it has been noted that, underlying it or following on it may be this condition of primary dementia. On the other hand, among these confusional cases are some which appear at first to be typical cases of dementia praecox, but which clear up completely and would falsify one's predictions were a too decided opinion emitted during the early stages.\* A further difficulty lies in the fact that, even in dementia praecox, remissions of symptoms may occur; so that here—as in general paralysis of the insane—too much stress ought not to be laid on an apparent recovery. In addition to the confusional state there may be also a preliminary period of excitement. The excitement and restlessness recur on many occasions with only short intervals of quiescence, very similar, in many respects, to manie-depressive insanity; but in contradistinction to it there is a steady, often fairly rapid, mental deterioration. In other cases the preliminary stage is one of depression, it may be with hypochondriacal delusions. It seems a reasonable hypothesis that, in these instances, there is, in addition to the general deterioration, a more selective action of the deteriorative factor, so that at first the true underlying condition is unmasks by the more prominent symptoms.

It seems probable that no one factor can be assigned as the causative agent in such a condition as dementia praecox. What appears more likely is that there is hereditary instability of the nervous system which renders it prone to deteriorate rapidly either under the normal stress of life or, *a fortiori*, when it is subjected to any unusual strain which would not upset the equilibrium of, let us say, the average individual. The likelihood of this being so is greater in that, in probably the great majority of cases of dementia praecox a history of mental disorder in the patient's family is ascertainable. This is, too, the more borne out by the fact that a certain

\*Major Hotchkiss draws attention to this difficulty in regard to the patients treated at the Dykebar Military Hospital. "There are," he states, "a number of cases recently admitted who were classed provisionally under manic-depressive insanity, but who will probably ultimately prove to be cases of dementia praecox." From his article, Stress of Campaign. Rev. of Neur. & Psych., Sept., 1917, XV, 295-297.

number of cases have developed definite dementia praecox subsequent to head injury; but obviously there must be some other factor than the injury to be taken into account. The same may be said of general paralysis of the insane; for, of the many who suffer from syphilis, only a small proportion afterwards are afflicted in that particular way.

The trauma acts apparently like a crystal dropped into a saturated solution, and becomes a focus wherefrom degeneration spreads. It is not, however, impossible that even the healthy brain may degenerate if the trauma is of a particular kind, and is associated with, for example, insufficiency of secretion of one of the ductless glands.

In one case the trauma took the form of compound fracture of the skull over the right Rolandic area, with opening of the dura mater and laceration of the brain. After the injury the patient was unconscious for a short time, but thereafter he was able to walk out of the trench with the aid of two of his comrades. On the same day the wound was opened up and depressed pieces of bone were removed from the brain substance, which bled very freely. The wound healed, but hemiplegic symptoms supervened. These passed off gradually, and power was regained. A little later a mental change was noticed; he became restless and excited, impulsive, and at times, difficult to control. The excitement passed; but already mental deterioration had taken place. Later he exhibited tricks and mannerisms; his memory became more and more impaired, and he steadily passed into a childish, mentally enfeebled state.

Although in this case no definite history of mental trouble in the family could be obtained, there was evidence of nervous instability, especially maternal.

In other cases progressive mental deterioration has been noted following head injuries; and in some of these, although the symptoms were not so clearly defined and so typical as in the one described, there was much that gave rise to the impression that some very similar change was taking place. This possibly may be the case in organic dementias following traumata.

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Not enough attention has been given the studies of Carlo Cinis on commissio cerebri. His work has been carried on for ten years. In his earliest paper (1908) he reported on the influence of the brain upon the testicle. These studies he extended to include the ovaries (1912) and made clinical, autopsical and histo-morphological observations similar to those of Laura Forster, elsewhere reported in this number. It appears that a severe concussion of the brain results in some molecular destruction. This dead cerebral material circulating in the blood by a specific selection acts on the sexual organs. In dementia praecox the similar destruction of cerebral tissues produces analogous disturbance of the sex glands.

## THE VALUE OF LUMBAR PUNCTURE IN STUPOROUS CATATONIA

G. WILSE ROBINSON, M. D., KANSAS CITY, MISSOURI.

The catatonic form is one of the common and well established types of dementia praecox and is characterized by catatonic excitement and stupor. Stupor of the most profound character may continue for months or years and a large percentage of the patients become hopelessly demented. Neuropathologists have attempted to trace the pathology of dementia praecox to an anatomical basis; on the other hand the psychopathologists have interpreted the disease as an inadequate, biological reaction due to internal ideas or external experiences. Whether we accept the theories of the neuropathologists or psychopathologists, I believe the following case reports prove that one of the important causes of catatonic stupor is an accumulation of an excessive quantity of cerebro-spinal fluid which by its presence and pressure interferes with brain function and is directly responsible for some of the symptoms observed in this condition.

Case one: Male, age 18, came under my observation June 4, 1915. The family history obtained had no bearing upon the present trouble. His past history was that of a healthy, normal boy with no illness of a serious character. The duration of his present illness was about four weeks; during the first two weeks of his illness he was highly excited with religious delusions and did not eat or sleep well. At the end of this period he became stuporous, refusing to talk, was very negativistic and strongly opposed to taking of food or water. For several days prior to June 4, he had refused all food and was untidy. When I saw him he was very weak, weighed but 105 pounds, having lost about thirty-five pounds in weight and was untidy. During the first two weeks he did not speak, was untidy and had to be fed forcibly and was extremely negativistic. During this period his weight remained about the same as it was June 4. June 18, a lumbar puncture was done, fluid pressure was equal to 280 millimeters of water, thirty cubic centimeters of fluid was withdrawn. The fluid was clear and normal in character. On the following day he was up and moving about of his own volition. On June 20 he talked; June 21 he fed himself and was no longer untidy. During the following week he gained five pounds in weight; at the end of the second week, following the puncture he was not eating so well, appeared to be a little stuporous, nor was he talking quite so much. Another puncture was done, fluid pressure this time was not more than 200, twenty cubic centimeters of fluid was withdrawn. After this puncture his condition rapidly improved. Two weeks later another puncture was done, ten cubic centimeters of fluid withdrawn. The pressure at this time was approximately 150. August 25th he was discharged as well. He was apparently normal mentally and in excellent condition physically, and has continued in good health since leaving the hospital.

and no time after the third day following the first puncture did he refuse to talk, was he untidy, nor did he have to be fed forcibly.

Case Number Two: Female, age 21. Entered the hospital August 7, 1915. Family history so far as could be ascertained had no bearing on her present trouble. Past history: Had been a normal healthy girl, was married at 18, was the mother of two children, one two years and the other eight months of age. She continued normal after the birth of the first child and for about four weeks after the birth of the second, at which time she became extremely nervous, excited and restless, with delusions of a religious character. After about three weeks of excitement she became stuporous, refused food and talked very little. At the time she was admitted to the hospital she was untidy and had to be fed forcibly. During the first three weeks the mental and physical condition of the patient steadily grew worse. On August 30th a lumbar puncture was done and forty cubic centimeters of a clear fluid withdrawn. The fluid was normal both physically and chemically, the pressure was 360. Before the puncture the hands were cold and blue and the pupils were widely dilated. The following day the hands and feet were warm, circulation very much better, pupils less dilated, patient talked more, was less negativistic and took food more readily. Patient improved mentally and physically for about two weeks. During the third week was not so well, at the end of that week conditions were much the same as when the first puncture was done. Another puncture was made and thirty cubic centimeters of fluid withdrawn. The fluid pressure at this time was not above 300. The patient again improved as before and was again not so well at the end of the third week; following the second puncture another puncture was done and twenty cubic centimeters of fluid withdrawn. This was followed by another period of mental and physical improvement. Two more punctures were done at intervals of three weeks each, fifteen and ten cubic centimeters withdrawn, respectively, the fluid pressure steadily declining, fluid pressure at the last puncture being 140. The improvement continued after this puncture, patient eating well, talking fairly well, but was still untidy for a while, occasionally at night. She was taken home December 27th, but was not entirely normal at this time. After returning home she steadily improved and when last heard from, three months later, was apparently normal, both mentally and physically, caring for her children and doing her own housework. This patient did not improve so rapidly nor steadily and the tendency to reaccumulation of fluid was much greater than in the case of patient number one, but conditions were continuously better after the first puncture was done.

Case Number Three: Male, aged 18, was admitted to the hospital November 12, 1915. Previous to his admission he had been excited for a period of two weeks, had fears, disposed to violence with delusions of

unworthiness. The family history was good. There was nothing in his past history of special significance excepting that he was supposed to be more religious than the average boy of his age and somewhat inclined to seclusiveness. One week after he entered the hospital a spinal puncture was done, the fluid pressure was found to be subnormal. Five cubic centimeters of clear fluid, normal in character, was withdrawn. The cataleptic excitement and the tendency to violence continued for a period of three weeks after he entered the hospital. At that time he became stuporous, refusing to talk, had to be fed forcibly, was extremely cataleptic and the muscular rigidity was the most intense I have ever seen. He was also untidy. Two weeks after the beginning of the stupor another spinal puncture was done. The pressure at this time was approximately 150, being about fifty points higher than it had been four weeks previously. Ten cubic centimeters of fluid were withdrawn at this time. This patient continued stuporous, cataleptic, very negativistic, untidy, with muscular rigidity and had to be fed forcibly for a period of six months. During this time, a spinal puncture was done on an average of once every four weeks and from ten to twenty cubic centimeters of fluid withdrawn at every puncture. The fluid pressure was always found to be above normal. In the early part of June, 1916, there was an occasional tendency to relaxation, he was less cataleptic, took food with less resistance but still had to be fed, showed a slight tendency to talk and at times manifested a slight interest in his environment. During the next two months there was slow but steady improvement. During his illness he manifested, to an extreme degree, the major symptoms of automatism, negativism, will disorders, speech disorders, mannerisms and neologisms. The last spinal puncture was done in July and at this time there was a decrease of fluid pressure as compared with the pressure at the time of the puncture just previously done. On August 6, 1916, he was removed from the hospital, taken to his home in the country where he continued to improve until about October 15, 1916, when he was apparently normal mentally and physically, and since that time has shown no symptoms of mental derangement. This case showed during the period of excitement a low fluid pressure as contrasted with the abnormally high fluid pressure during the period of stupor and during this period there was a continued tendency to reaccumulation of fluid in an abnormal quantity.

The first result of this increased quantity of cerebro-spinal fluid is to crowd the cranial cavity and when the cranial cavity is crowded from any cause, there is a disturbance of brain circulation. The brain substance cannot be compressed into a smaller space, for the nervous tissue is practically incompressible. A part of the increased pressure is cared for by the distension of those portions of the dura of the spinal cord which are distensible, but if in spite of this compensatory mechanism the pressure attains a certain height, those parts of the circulatory system which can be

compressed most easily, the veins, just before they enter the bony cavities are compressed and may be even closed, causing stasis of blood. Grasty says this increases the intracranial pressure, the pressure rises within the veins until they are temporarily opened, some blood escapes, then they close again; as he says, they vibrate. If the pressure continues to rise the next result is a compression of the arteries. A compression of the arteries results in brain anemia and one of the effects is stupor. After the arteries are compressed they will continue in a narrowed or even closed condition with much less pressure than was originally required to compress them, and a material lessening of the intracranial pressure is necessary for a relief of the symptoms which have resulted from the pressure, but if the increased intracranial pressure is continued over a considerable period of time, interfering with cortical circulation, nutritional changes of a degenerative and semi-inflammatory character may occur in the cortex, providing in some of the old chronic cases of catatonia, the pathological picture which is found at autopsy. In the three cases reported, the blood pressure was continuously low with contracted peripheral vessels, during the stage of stupor, and it has been my experience that this is generally the case. This would be a contributing factor to the easy compressibility of the cerebral arteries. After the withdrawal of a quantity of fluid by lumbar puncture, blood pressure would rise ten to fifteen points due to improved cardiac function. This increased blood pressure tended to open the compressed arteries, giving an improved cortical circulation and a betterment of cell nutrition. This, I believe, was responsible for the improved mental condition and lessening of the stupor following the decrease of the pressure by lumbar puncture.

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Now there are two primary classes of ideas about government in the modern world depending upon our conception of the political capacity of the common man. We may suppose he is a microcosm, with complete ideas and wishes about the state and the world, or we may suppose that he isn't. We may believe that the common man can govern, or we may believe that he can't. We may think further along the first line that he is so wise and good and right that we only have to get out of his way for him to act rightly and for the good of all mankind, or we may doubt it.

But, on the other hand, while we may deny this universal distribution of political wisdom, we may, if we are sufficiently under the sway of modern ideas about collective psychology, believe that it is necessary to poke up the political indifference and inability of the common man as much as possible, to thrust political ideas and facts upon him, to incite him to a watchful and critical attitude towards them, and above all to secure his assent to the proceedings of the able people who are managing public affairs. Or finally we may treat him as a thing to be ruled and not consulted.

H. G. WELLS, in *New Republic*.

## NOTES FROM THE HISTORY OF RECOVERED PATIENTS\*— (Continued)

Before beginning the history of the second patient to recover after the administration of isotonic salt solutions, a few words as to the method may be valuable, especially as the action of the remedy is so uncertain and variable. In our laboratory, water was used freshly distilled from the glass apparatus. The salt was chemically pure  $\text{NaCl}_2$ , weighed carefully to 0.9 per cent of the amount of water to be used, and, after mixing, sterilized in the flask from which the injection was to be made. It was then cooled down to about  $160^{\circ}$  F. and stopped with a sterilized, doubly perforated cork, with pure gum tube and glass point attached. After this the flask was inverted and raised until the tube and point were filled, when the clamp was pinched. The sterile needle with a short bit of rubber tube on it was then inserted into the patient's median vein. As soon as blood appeared the glass point was connected with the needle, the clamp released, and the inverted flask raised to the proper height. It usually required twenty minutes for the solution to run into the vein. The patient's pulse, and not infrequently his blood pressure, was occasionally taken during the process, and the injection retarded by bringing down the flask if there was any marked disturbance. As a matter of fact, there never was any pain, shock, or marked fluctuation of blood pressure in any of our patients. There was never an accident of any description. Following the injection the patient was put to bed for an hour and urged to stay in bed, but as a rule he was about the wards as soon as he left the operating room. The pulse and temperature were taken regularly, but no patient had any temperature disturbance.

Ishida does not describe, either in his original Japanese *Revised Psychiatry* or in his article in the *American Journal of Insanity* his solution or his technique. He says he prepares his solution from "common salt." He does not, however, have any fear of temperature following the injection, but says he considers a raise in temperature beneficial.

He gives anodynes before and after his injections, as though the patients suffered pain. Now, we observed no pain in any of our patients, and no high temperature.

In a recent number of the *British Medical Journal* Auld† relates his

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†Auld, A. G., Pyogenic Therapy with Remarks on Colloid Metals. *Brit. Med. Jour.*, Feb. 16, 1918. p. 195.

experience in treating patients with non-mental diseases by the injection of metallic colloids. He noted beneficial results only when there were thermal reactions of a very pronounced character. Individual solutions gave idiopathic results that other solutions, prepared with equal caution, failed to realize. Auld concluded that the trifling contamination of solutions with protein matter of unknown constitution was responsible for the effects which had been attributed to the metallic colloids.

My own experience and the experiences of my colleagues in the treatment of dementia praecox patients with sodium nucleate suggests the same possibility. Namely, that our favorable results were due to the accidental contamination of our "Lundvall Solutions" with extraneous substances, or with the products of accidental hydrolysis resulting from heat and chemical action in preparing the mixture. This presumption of accounting for the variable and frequently disappointing action of the Lundvall Solution is not the less likely, since Walter Jones has recently demonstrated that the old formula of nucleate acid was that of a mixture.

As long as the rationale of the isotonic sodium chloride solution injections in this disease is unsatisfied, we may expect irreconcilable and disappointing results.

The patient whose history was given in the previous number of this Journal (p. 50) has gone into training at the Naval Station, and the following case is the only other patient cured by this method in our laboratory.

*Notes from the History of Clement Balinski*

Clement Balinski, fourteen years old, was admitted to the Psychopathic Hospital May 21, 1917, in a greatly disturbed and excited condition. His admittance followed several attempts at suicide.

He was born and bred in Chicago, of Polish parents. His father died of tuberculosis of the lungs at the age of thirty-three years. He was a heavy drinker and had venereal bubos, requiring operation at the County Hospital. His mother, now forty years old, is a healthy woman. She was born in La Salle County, Illinois, and is now at work.

Clement was born in Chicago in 1903, was breast fed, but had been a nervous and irritable baby. He had measles when four years old, and though he has always been well, he has never been free from severe constipation. He was robust, pugnacious, very active, and alert. His sole complaint has been obstinate constipation, for which his mother gave him senna tea. He would often go a week without a movement of his bowels.

When he was six years of age a larger boy kicked him and drove one of his testicles into his abdomen. He was taken to the Cook County Hospital and operated upon for its reduction. He was in the hospital two weeks, and when he came home he was terribly constipated and was given

rectal injections. The testicle is now in place. He attended the Polish school and was a bright, smart boy, who liked to get out of work.

In the winter of 1916-1917 he was working as an A. D. T. messenger boy. In the spring of 1917 his mother noticed a change in his disposition, especially that he became unaccountably obliging and polite to his brothers and sisters. This was followed by a period of melancholy and sadness, with great religiosity for a week or two. He quit his job and his condition improved. He went to work again and was all right for about a month, when the sadness and melancholy returned, with great depression and delusions



He thought his mother had poisoned his food, and would not eat of it unless she first tasted it before him. He was questioned by his mother, who was suspicious of his repentant attitude and his humiliation. He admitted that he practiced self-abuse with the messenger boys. He was nervous and disturbed for a month.

The third attack came on with melancholy and depression. His sadness and depression removed all desire to play. He went to his brother-in-law, who is a physician. After examining the lad and taking his history, the brother-in-law prescribed a laxative. Clement refused to take the medicine and said that it was poison. The next day the doctor came and compelled him to take it. At once Clement became very much disturbed and cried out that he was poisoned. He kept this up for two or three hours and then went to sleep. This was on Friday. He slept all night. Saturday morning he got up in good condition. He would not take his medicine, however, until his mother and the other children had taken a dose of it, and then he con-

sented to take his dose. At once he became disturbed again, crying aloud that he had been poisoned and that he had poisoned the entire Balinski family. This outcry lasted two hours.

He began to froth at the mouth, the doctor was immediately called, the boy was given a hypodermic injection, but without relief. He now believed he was to die as the result of the hypodermic, and was distressed that he could not die at once. He was restless all Saturday night. On Sunday he became violent and had hallucinations, fearing he would be buried alive. He begged his mother to poison him so he could die.

Sunday evening his uncle came in, and finding him noisy and disturbed, told him to go and lie down, when suddenly Clement stood as if hypnotized, and when he would have fallen he was found to be completely catatonic and rigid. This condition lasted at least two hours. The next morning he was still in terror of being buried alive, and made such efforts to kill himself that he was taken to the Psychopathic Hospital on Monday noon.

The foregoing information was obtained from the mother.

At the hospital the patient was placed in a continuous bath and given an enema and with great difficulty was induced to swallow some laxative pills. He was sullen, suspicious, and afraid of everyone who approached him, and several times tried to drown himself in the bath tub. He did not sleep, he was afraid of something pursuing him, but could not tell what it was. There was marked negativism and resistance, but little catatonia and mannerism. He would not eat for fear of poisoning.

Clement Balinski is a well developed, handsome boy, apparently about fifteen years old. He weighs 107 pounds and is five feet three inches tall. He has blue eyes and light brown hair, and is a moderate blond. The teeth are good, and there is some enlargement of the tonsils. The tonsils are ragged as if cut or ruptured. The thyroid is not enlarged and there are no lymph glands in the neck or under the occiput.

The chest is well shaped, thirty-two inches in circumference, and the rib excursions are regular and normal. There are no blue veins over the chest. The lung expansion is four inches, the vesicular sounds puerile, without rales. The heart normal area and sound. Apex in fifth interspace. The abdomen shows no abnormality on inspection and palpation, except general rigidity.

The genital apparatus is normal and adolescent. The scar of the operation in the groin, as if for hernia, was made for incarcerated testicle.

There are no paralyses or tremors. No anesthesias. His vision is good, he has never worn glasses. Visual field normal. Pupils equally dilated, react to light. Veins in upper lids conspicuous. Same condition behind the ears and over mastoid. Articulation good; speaks both English and Polish, says he does not speak Polish very well.

Superficial reflexes present and normal. Deep reflexes present and normal except the knee reflex, which is difficult to elicit except by reinforcement, when they are quite brisk. No Romberg or Babinski.

Attention seems undiminished. There seems to be little retardation, though some was observed when he first entered the hospital. He answered questions at that time rather slowly or not at all. He has never been mute, but answered questions slowly or not at all because he was suspicious and afraid.

He declares he never heard voices, but says he heard "snapping" in the room where he was, and snaps his fingers in imitation of the sounds heard. He never heard people talking about him or to him, and did not see spirits or strange sights.

He had no enemies, he says, but many boy friends at the telegraph office where he had been employed. He knows he had "wrong ideas," as he called them, when at home and when he first came to the hospital. He thought they were going to bury him alive. "They" referred to any doctors who came into the ward.

He was afraid the "white stuff" (the barium meal) was concrete, and that it would harden in him and clog him up. He could not understand why people would do such awful things to him.

Just before he came to the hospital he was so melancholy he wanted to die. When asked why he tried to kill himself he said he did not know what he was doing while at home. He remembers walking around the room and crying and throwing himself down on the bed, and that is why his mother got a man to take care of him. When this man came he quieted down for awhile and then he got the fever again, the blood rushed to his head and he started to cry again.

The patient's sleep is not improved. In spite of the bath he stays awake sometimes all night. The attendants say he eats rapidly.

He is quite well behaved and properly dressed. He says he likes the place and wants to stay until he gets over his nervousness. He seems to be getting over the idea that people want to put him in cold water or bury him alive. He is easily led to talk about his condition, which seems to confuse him. He says he came here to get cured of stomach trouble, that he has great distress in his abdomen much of the time. He says he has improved some, but does not want to stay here more than two or three weeks.

Barium meal and fluoroscopic examination made the week of May 29th. There was a delay in the cecum of only twenty-four hours. The meal had not left the cecum twenty-four hours after the ileum was empty. The patient's disturbed condition made the examinations difficult and unsatisfactory.

One hundred ten grams of stool were examined on June 16th. It was brown and semi-solid. Watery extract centrifuged, decanted, and reduced to 110 cc. in vacuo. Proteose, +. Pauly ++, skin reaction +, oxytoxic +.

No organisms that would grow on Endo's medium were found in the urine.

The Yerkes-Bridges Point Scale examination was made on May 24th (and subsequently), by Dr. H. C. Stevens. Total credits, 71; mental age, 13-14; coefficient, I. A. 71-75ths.

The blood was taken several times for examination, and generally presented the following picture. The red corpuscles were 9,000,000 to 8,500,000; the hemoglobin index 100— (Sahle). The white corpuscles varied between 12,000 and 10,400; small mononuclears, 0.20; large, 0.07; polynuclears, 0.71; eosinophiles, 0.005; Wassermann on blood serum, negative. Arneth peak at II.

The defensive ferment reaction was characteristic. Namely, cerebral cortex—; visionary sensory+++'; vision motor—; speech motor+; speech sensory+; frontal association, 0; parietal association, 0; auditory, 0; corpus callosum, 0; pineal, 0; pituitary, posterior 0, anterior++'; infundibulum, 0; optic thalamus, 0; basilar nucleus, 0; dentate nucleus, 0; pons, 0; medulla, 0; spinal cord, 0; parathyroid, 0; thyroid, 0; adrenal, 0; testicle, 0; liver, 0; spleen, ?; gall bladder, 0; kidney+; ileum, 0; ileocecal valve, 0; appendix veriformis, 0; cecum, 0; vagus+; lung++'; prostate, 0; control, 0.

Spinal puncture was made several times, intraspinal pressure 160 mm., Lange, 0; cell count, 4; Nonne, 0; Ross-Jones, 0; Naguchi, 0.

Blood pressure usually very low, 80 mm., cystolic. Adrenalin pressure reactions not executed. Mydriasis, positive.

During the months of June and July normal salt solution was intravenously injected once a week—750 to 1000 cc. There was no thermal reaction, but great mental and physical improvement. No other treatment was used except the daily routine. At six in the morning a hot and cold shower, rubdown, and dress. At seven, breakfast; 10:20, milk or fruit juice; 10:30 to 12:00, employment, re-education; 12:00, dinner; 1:30 to 3:00, employment, amusement; 3:30 shower bath, rubdown; 5:30, supper; 6:00, ball game in courtyard.

He was discharged August 2, 1917, and went to work the next week. On December 5, 1917, he came to the Chicago Medical Society to show himself, when six other dementia praecox patients were presented. He has been well and shown no relapse up to April 1, 1918.

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Wrong hypotheses, rightly worked from, have produced more useful results than unguided observation.

AUGUSTUS DE MORGAN.

REVIEW OF "NEWLY REVISED PSYCHIATRY" (SEVENTH EDITION), by Doctor Noboru Ishida and Doctor Hidezo Kure.

The medical fraternity of Nippon has devoted much attention to this latest Japanese book on psychiatry. The work is written in Nipponese, bound in European style, and contains 550 pages, with more than forty plates and halftone reproductions of photographs. Its greatest value to students and practitioners lies in its many clinical examples of cases treated by the author himself.

In the preface the author insists that the old method of confining patients in prison-like custody is a thing of the past and is no longer pardonable in this civilized, progressive and scientific era. For the past three years he has had wonderfully successful results in his experimental and practical treatment of mental cases in his own hospital, with its open doors and gates, with no restraint, and the complete absence of locks. Plenty of sunlight, much fresh air, selected diet, and unlimited freedom, are the important things that hasten the patients' realization of their own condition. Of especial significance in the application of this system the author gladly reports no case of suicide in three years, and only a few cases of escapes, or, more precisely, "runaways," that caused no alarm among the patients themselves and created no disturbance among the public.

Following the introduction, with its definition of psychiatry, and its history of the development of psychiatry from the days of Hippocrates to now, Dr. Ishida presents the following:

*Classification of Brains.*—All people are divided into eleven classes. First is the normal class, comprising four-fifths of the population; second, is the wise and clever group that make up one-eleventh of the population; third is that small, but very intelligent class comprising two-tenths per cent of the people. Geniuses make up the fourth class, and of these there are not more than from one to four in a generation. Fifth, the eccentrics, about one in five hundred; sixth, the subnormal, about one-eleventh of the population; seventh, the curable insane, who number about one in every five hundred people; eighth, the incurably insane, or two-tenths per cent of the population; ninth, epileptics, one in seven hundred people. Tenth is the class of feeble-minded who can be made useful by education, comprising three-tenths per cent of the population; and lastly, the hopeless idiots, consisting of one-tenth per cent of the population.

On the whole, insanity usually reaches its maximum and either stays there the remainder of the patient's life, or gradually reverts to its starting point. The usual duration is from a few months to a few years, and if at the end of this time no change is visible, the prognosis is very bad. In Germany recovery is reported in from thirty to forty per cent of all cases, but in Nippon only from twenty to thirty per cent are on record. "Then let us not hastily conclude," says Ishida, "that all mental cases are unresponsive to treatment, and at the same time, let us not consider a remission as a recovery."

In diagnosis several points are emphasized as particularly important; among these are: examination of the size and shape of the head and face; the pupils and their reactions to light; the poise and movements of the patient; reactions to environment; determine whether the patient's reactions to stimulations are active or sluggish. By questions discover the presence or absence of illusions, delusions, or hallucinations; the presence or absence of the consciousness of self; and whether the patient is or is not capable of recognizing the fact of his illness.

In the prevention of insanity the physician must ever be alert and watchful, and his attention should be especially directed towards children with symptoms of mental weakness. He must see to it that such children are guarded from too much study, and bodily ailments—sexual anomalies, parasites, tumors, must be examined for. Since all grade school work is theoretically adapted to meet the unstrained performance of all normal children, any child unable to do the work should receive immediate mental and physical examination. These precautions observed and a little progress toward prevention will have been made.

In the case of adults the situation is more complicated. When the mental symptoms appear the problem is already two-fold in the necessity to check the progress of the psychosis, and to discover its cause. The first duty in such cases is to render adequate medical service, the second duty is to recommend vocations in themselves therapeutic, such as gardening, farming, or other outdoor activity. When the family history is doubtful, family marriage must be strictly forbidden. If venereal diseases are present, treat them effectively, and such states as alcoholism, morphinism and cocaineism must be thoroughly and promptly removed.

The foregoing paragraphs present in rapid, didactic summary the first four parts of the book under discussion. In Part V Doctors Ishida and Kure discuss the various insanities in greater detail and present that part of the work most interesting and pertinent to the subject of this journal. Beginning with the Aberhalden Reaction we find them greatly in favor of its use, and here copy only one of its many reports. One hundred thirty-three cases were subjected to the Aberhalden Reaction and the results obtained are as follows:

	Cerebrum	Thyroid	Genital Glands
Normal Cases.....	0	0	0
Dementia Praecox ....	70% Positive	30% Positive	80% Positive
Paralytic ..... .	97% Positive	71% Positive	71% Positive

The conclusion drawn is the obvious one that changes in the brain and the glandular structures have taken place.

The following paragraphs will constitute an abstract rather than a review of Part V.

There are two types of endogenous deterioration: (a) dementia praecox, and (b) paraphrenia.

Dementia praecox is principally found among young people, and particularly at the age of puberty. The earliest symptom is a peculiar change in the patient's mental condition, which is then followed by sudden progress into insanity. It is one of the most dangerous forms of mental disease known, and under its classification come fully twenty-five per cent of all mental disturbances.

The leading cause in 50.7 per cent of dementia praecox cases is hereditary taint, and it is noticeable that the first or the last child of a family, or a child born just after an abortion are especially susceptible. Other causes are alcoholism or syphilitic infection of the parents, or a melancholy, aloof disposition of the child, although Bruce claims that the latter is caused by a "chain type of cocci" infection. The physical causes that have been recognized include disturbances of the genital glands, of the thyroid and parathyroid, and other glandular irregularities; metabolic disturbances, chronic toxemia and purely psychological disturbances.

Anatomical changes are clearly visible in the cerebrum, the frontal, middle and temporal lobes showing the greatest alterations, while scarcely any change is noted in the back part of the brain. Atrophy of the nervous tissue is less pronounced than in cases of paralysis. Some investigators report sclerosis of the nervous tissue, others a fat-like degeneration of the same. According to the investigations of Moriyasu intracellular degenerative processes are given as the main cause, while Wada has shown intercellular changes in the frontal and temporal lobes, a finding supported by the clinical findings of loss of the higher intellectual powers.

The general symptoms of dementia praecox are many and varied. The first glance at a suffering patient conveys a sense of incurability as though the case were utterly hopeless, while in reality the contrary is more likely true. The patient's sense of recognition and orientation is still in fair condition, excepting only the periods of excitement, for they are able to give correct answers to the questions regarding time, place, and surroundings. Illusions, delusions, and hallucinations are common symptoms; loss of ability to concentrate is a typical failing; memory is usually good, although the thoughts of the patient may be illogical and incoherent. There is a tenacious grasp upon some one idea for long periods of time, paralogical processes are continually in operation, symptoms of hypochondria, and delusions of grandeur are frequent. The emotions are frequently displayed in moments of excessive passion or excitement, but they gradually decline to dullness and stupor, and in some cases, the catatonic particularly, the stupor results in a loss of feeling and interest. Eighteen per cent of all cases present symptoms of negativism, stereotypy, verbigeration, tetany, epilepsy, hysteria, paramimia, and parabulbia. Among the more obvious physical symptoms are dilation of the pupils, edema, dermography, low temperature, disturbed menses, thyroid enlargement, protrusion of the eyeballs, shivering, and loss of weight. Sometimes the weight may be regained, though often

the emaciation is so great that the patient dies without regaining strength. Even though the patient may present either the symptoms of undue fasting, or intemperate eating, the loss of weight is an inevitable result. Sleeplessness is not uncommon in dementia praecox.

Dementia praecox is known in several forms, classified as catatonic, semi-catatonic, hebephrenic, and paranoiac. It appears more frequently among girls than among boys, and it develops unequally, progressing with great rapidity in some cases and with painful slowness in others. Before the twenty-fifth year the patient usually recovers or degenerates into insanity.

Diagnosis is always difficult; for example, the differentiation between neurasthenia and dementia praecox of the hebephrenic type rests chiefly upon the presence or absence of illusions and hallucinations in the patient. Differentiation between hysteria and dementia praecox is based upon the vacillating and fluctuating mental characteristics of the hysterical patient. Epileptic insanity closely resembles the catatonic type of dementia praecox, with this difference, however, in epilepsy the patient acts blindly, while the catatonic possesses a small measure of reason. In dementia, which is generally preceded by an infectious disease of some sort, the mental disturbances are more pronounced than in catatonic patients, especially so of the sensory disturbances. Great care must be exercised in the differentiation of the catatonic dementia praecox from manic depressive insanity; in the former, pleading and weeping are steady and prolonged in spite of the emotions, while the latter is characterized by passion, excitement, abruptness and impulsiveness, all influenced by the surroundings. Paralytic cases may be diagnosed by the fixed pupils. Paranoid dementia praecox develops the most rapidly and culminates the earliest of any of the forms classified.

Detailed descriptions of all cases described above are given by Dr. Ishida, with examples from his own practice.

The dreary prognosis of adolescent insanity is not hopeless. Sudden changes and vehement negative conditions are signs of hope that usually terminate in recovery, with the merest trace of mental aberration. Catatonics have the best chance for recovery with a record of thirteen per cent; hebephrenics come second with a record of eight per cent, while no recoveries are reported in the paranoiac group. According to Schmidt, out of 455 dementia praecox cases, 15.5 per cent recovered with slight mental defect, and 16.2 per cent completely recovered.

Obviously, the sooner symptoms are detected, the better prognosis of the case. Helpful measures in treatment are many, carefully regulated diet and periods of sleep, bed treatment, hydrotherapy, artificial stimulation of bowel movement, simple employment, and in extreme cases sleep may be facilitated with hypnotics and anesthetics. The intravenous injection of 0.9 per cent saline solution once every week or two has proven successful, subcutaneous injections have a less powerful influence.

Some sort of employment seems essential in the treatment of these patients. The establishment of a colony for them is, of course, the ideal, for it will not only aid them therapeutically, but they will aid in its financial support by their productive labor.

The most insidious onset of dementia praecox is in the heboid-phrenic type. The onset of symptoms is so subtle that the people about the sufferer are unaware of any mental change until it is too late for successful treatment. A feeling of heaviness comes over the patient, who then loses energy, interest, sleep, and begins to have illusions and hallucinations. To all outward appearances the victim is merely lazy, unless hallucinations are present, when the diagnosis is made easy.

An example of this form is presented in a young woman twenty-three years old in good physical condition. The immediate cause of the disease was a hold-up, in which her life was threatened for money. The family history is free from mental disease, with the exception of the patient's sister's eldest child.

Present findings are a big scar on the forehead received in childhood. There are no other anomalies. The pupils are dilated, all other reactions are normal and the general health is good; the body is well developed. Slight traces of catalepsy and echo symptoms are found. Orientation of time, position, presence of mind, arithmetical sense, sense of sickness are all present, but the patient takes a longer time to answer questions than is normally considered necessary. The prognosis is good.

In hebephrenia we find greater force and rapidity, with more spirited action than in the heboid-phrenic type, while the hallucinations are more pronounced than in the catatonic type. However, the actions are less violent than in catatonia, the patient is more depressed, given to abrupt periods of excitement, during which attempts at suicide or running away occur. During these periods, also, the patient swears vehemently at apparently nothing, while it is not at all uncommon for the patient to inflict injuries upon others, commit arson, or develop vagrancy. Such periods of excitement are likely to settle into monotonous stretches of pessimistic depression more or less hypochondriacal, with a loss of endurance and abhorrence for employment of any sort. There is a weak negative attitude toward everything, verbigeration, stereotypy, masturbation, incoherence in speech and writing, while all the time the sense of sickness, of time, of place, and of environment is good. The memory seems to be unaffected. The physical symptoms are a rapid pulse, dermography, slight tremor, increased deep reflexes, fits, fainting spells, and, at times, enlarged thyroid.

A university student, thirty-one years old, illustrates this type of dementia praecox. He had had a gonococci and a syphilitic infection near his twentieth year, but is now healthy. He is a shy man, educated by his mother, who treated him too liberally for his own good. His school record shows a steady decline in ability; he was an honor student in the grade

school, not above the average in high school; a little below the average at college, and a poor student at the university. He has masturbated since he was ten years old. The family history shows the father to be well, but the mother has had some nervous troubles. The patient is their only child.

We may safely say in this case that heredity is a leading cause, and the continued masturbation from childhood, with the gonococci infection and specific infection a more obvious cause. The gradual decline of energy is shown by his school record, he became weary of study, became irritable, spoke loudly in his room, took excited walks, and kicked at things needlessly. He was sent to a medicinal spring for rest, and while there began to have delusions; the lamp chimney resembled the head of a snake, figures of women in night clothing appeared within the lamp chimney, voices of people praying underground came to him, or he heard the voice of his dead grandmother. He laughed and wept while kneeling before the portrait of the late Emperor Mutsuhito, and many other strange acts were performed by him.

The present findings reveal no anomalies but the thin, expressionless face and the lack lustre eyes, with dilated pupils. Blood pressure and pulse are normal. Answers to routine questions were all correct, and he admits feeling strange, and very irritable.

Diagnosed as hebephrenic dementia praecox.

Kahlbaum was the first to discover catatonia and Kraepelin began its clinical study. Characterized by rapid onset, it is otherwise difficult to distinguish from other forms of the disease in its early stages. Depression, illusions of sight, of hearing, of taste, and other hallucinations are common. These hallucinations include the belief in a murder the patient has committed, or the punishment for such a murder, a fixed idea that relatives, friends and parents have lost all interest and love for the patient, or a gruesome fancy that his brain, or stomach, or intestine, or some other bodily organ has been destroyed by cutting into bits or melted into one mass by inimical and unknown forces. Slowly, hypochondriacal ideas develop in power, and delusions of wealth, of grandeur, of power, or of exceeding personal beauty dominate the patient. Power of orientation, of comprehension are lost, the progress of thought is incoherent, while all the time the memory may be good.

These hallucinations are manifested in a sense of worry and inner turmoil that finally break out in piteous pleas for mercy or safety, until the patient, harassed beyond endurance, breaks out in wild excitement, attacking others, mutilating self, or, if sexually disturbed, attacking someone of the opposite sex. These patients assume poses either standing or lying down, and when moving at all do so lazily. They laugh or cry or pray for a day at a time. Negativism develops. Eating is irregular, at one time the patient fasts unreasonably and at another time plays gourmand and eats excessively, or dislikes to eat before other people and cannot be made to

do so. They become filthy, play with excrement or sputum. These patients will answer irrelevantly without making any effort to understand the question put.

In catatonie dementia praecox, fifty-nine per cent are said to degenerate into weak-mindedness, twenty per cent have periods of remission, and a record of complete recovery is reported in eight per cent of the cases. It has been observed that catatonic women often become pregnant during the periods of remission.

Dementia paranoia is divided into three groups, all of them resembling dementia praecox of the catatonic type, though none of them are so rapid in progress and the illusions and hallucinations are more irregular.

First is the dementia hallucinatory paranoidia. In this form the so-called double thoughts are clearly shown. The patient's thoughts are personified, and the idea that remedial measures—the x-ray, gas, electricity—are forms of "physical torture" possess them. Orientation seems good, but speech is incoherent and meaningless. The departure of the hallucinations leaves the patient an idiot.

Second is Kraepelin's dementia paranoidies. Much similar to group one, this group possesses a well-marked characteristic in its fluctuating, incoherent, and repeated hallucinations. There are such cases as this one. A patient complained that his head and neck had become dislocated, that someone had carried away his intestines, that his food had been poisoned by conspirators, and that by some magic power all his thoughts are read by others, and every night the stars pass through his room. At times he thinks he is a great orator, a remarkable dancer, an expert fighter or what not. Though his mind is impaired he is able to read and understand lighter magazine articles. The power of recognition is diminished, but sexual feelings are increased. After a period of swearing and other violent actions a gradual downfall follows until hopeless insanity marks the usual fate of such a patient.

Third is dementia fantastic paranoidia. Here the hallucinations are more systematized and the duration of the disease is longer than in the two other forms before insanity is hopelessly reached. The hallucinations are of an airy, felicitous character that develop from some trivial circumstance of daily life, viz., the report of a gun and the patient immediately sees himself as the general-in-chief of the army, with the newspapers crying extras about his achievements.

Paraphrenia is one of the groups classified under paranoia. It is named by Kraepelin and is characterized by peculiar changes of apperception, comprehension, and subjective activities. There is a disturbance of will power, accompanied with dullness of sensation. With all probability of terminating in hopeless insanity it is unlike the other types in that it retains harmony of ideas, of feelings, and of activities, much weakened, it is true, but so balanced that no pitiful alteration of personality is effected.

REPORT OF THE PSYCHOPATHIC RESEARCH LABORATORY,  
COOK COUNTY HOSPITAL, CHICAGO.

By BAYARD HOLMES, B. S., M. D., Director.

The history of research into the causes, the possible cure, and the prevention of such diseases as manifest themselves in mental aberration, is a sad and pitiful one. The results in foreign countries are quite as disappointing as those at home. The problem is one which requires the concentration of every possible method of investigation and study, and it requires also a motive and a devotion which has not been realized in the management of institutions having the custody of these unfortunates.

A survey of the conditions in this country brings us at once to a realization of the magnitude of the problem and to a full understanding of its economic possibilities and the desperate and pitiable condition of these adolescent insane. There are not less than four hundred institutions designed for the custody of the insane established by the several states, and frequently by cities and counties. These institutions care in a more or less humane and adequate manner for the confinement of the 250,000 lunatics who have been committed to their care by the action of courts upon a wholly symptomatic basis. More than 60,000 patients of this sort are committed each year, and this is done at a legal expense averaging more than \$20.00 a patient. It is safe to say, then, that the legal processes of commitment alone cost Cook County not less than \$60,000 annually. In the City of Chicago at the present time the commitments exceed 3,000 a year. The expense of the Psychopathic Hospital, which is largely a detention hospital, was estimated in the last appropriation bill at \$154,000. The court for commitment meets each Thursday and is presided over by one of the county judges. There sits beside him the county physician and superintendent of the psychopathic hospital, whose salary is \$3,500 a year. Next to him sit the two resident physicians receiving together \$3,600. Upon the other side sit two physicians who receive 50 cents apiece for each patient committed; which amounts to about \$3,000 a year. Besides this there are stenographers, court attendants, nurses, members of the Social Welfare Department, and investigators, making a total of twelve or more persons conducting this antiquated, traditional and futile function. This is not exceptional, but is paralleled by similar courts in other large cities, and much more expensive and crass methods in small towns.

It is within the memory of our grandfathers that the insane were first provided with an asylum. How dreadful their condition before that time we can scarcely conceive and we do not wish to contemplate. Through the labors and the devotion of an army of humanitarians the several states one after another built monastic-like institutions into which the insane were gradually collected and kept. They were removed from the poor-houses, the jails and the private pens with which our ancestors were familiar. They were picked up from the streets and removed from reformatories and prisons.

My own memory goes back to a garden spot in northern Illinois in 1875. A wealthy farmer with large and full barns and a beautiful house had built a pen in his apple orchard where he kept his insane son. It was my misfortune to stumble upon it, and the horror of the place has never left my memory and comes up after more than forty years in my night-mare dreams.

At the present time the campaign against the county care of the insane has terminated in a surrender by the county grafters, but the end is not actually accomplished. In a few states the promise to remove the insane from county care to state care is as far as we have gone.

The standard of custody in the several states varies in a most remarkable degree. The material construction of the buildings, the proximity to or remoteness from the critical surveillance of large centers of population, the exigencies of legislation, and the personal equation of superintendents and party patronage make all the difference between laudable efficiency and damnable spoliation in the conduct of our asylums.

But waves of reform pass quickly from state to state, from institution to institution, and the average efficiency of our custodial asylums has risen from decade to decade. In custody alone further improvement seems almost impossible, and at the present time the conscious effort of all state commissions is to secure the passage of the institutions from custody to cure—from the protection of society from the insane to the protection of the citizens of the state from the catastrophe of insanity itself.

The custodial institutions as they are, harbor idleness, tuberculosis, pellagra and many institutional diseases. It is said that more than fifty per cent of the patients with dementia praecox die of tuberculosis of the lungs.

The common people and the medical profession know very little of what is going on in the institutions for the insane. The alienists who commit the insane, the so-called psychiatrists (soul curers), who are the professional keepers of the insane, are a cult by themselves. Their state of mind is almost inconceivable either to the medical profession as a whole, to the common people or laity, and certainly to the rational scientific investigators of physical phenomena. The pessimistic and hopeless attitude of this group maintained by the state in salaried serenity is not easily broken into by the naïve idea of research into the cause and possible cure of the conditions which furnish them the material for their gruesome occupation.

Nevertheless we see that in four states at least there has been forced upon the administrative keepers of the insane by the trend of time and change, the necessity of establishing so-called psychiatric institutes. The first was opened in New York under no less a morphologist than VanGiesen. After a very brief interval he gave up the idea of finding any physical basis for the mental symptoms which his patients manifested. He has been fol-

lowed by a series of distinguished leaders of research who have brought forth little more than apologies and hypotheses. One of the last of these in a recent report says:

"It has taken much energy and unwavering determination to pass by many of the fads of the day and appear (in our psychiatric institute) unprogressive in matters which have directed the naïve and the clamorous, to profess ignorance and a passive attitude concerning certain matters which were heralded as simple and final explanations, where we were more concerned to get a broadened rather than a narrower grasp upon such things. I cannot see that much has been missed. The result is that we have but few outfits for work bought at great expense merely to be stored away after the wave of interest and disappointment had passed; and also little of the kind of notoriety which looms bright in Sunday magazines, excites false hopes, brings a questionable amount of personal glory and in rare instances a choice morsel to those who like to adorn their negative life with an 'I told you so.'"

At a recent visit to the Psychiatric Institute at Wards Island, New York, we found one morphologist and one chemist at work under the director. New York spends ten million a year for custody, but not ten thousand a year for research.

In Massachusetts the Psychopathic Institute is rather a hospital than a research laboratory. It is a worthy institution and serves a very proper need to those who feel themselves about to succumb to mental disease. It has a large following of organized social workers and is an educational institution of great value to the community and to the state. The amount of time, energy and devotion expended upon the research is probably greater than that expended in any other public institution of the kind, but it is wholly inadequate to the problems of the insanities.

In the State of Michigan there is a Psychopathic Hospital on the grounds of the University of Michigan. It is in no sense a research laboratory. It furnishes an observation ward for patients of a picked class, and it furnishes the university professor of psychiatry a moderate clinic. It has little relation to the institutions of the state and not much influence upon the state of mind of the legislators or the people toward the problems of the insane.

The Psychopathic Institute of Wisconsin has never had any research program. With great enthusiasm Dr. W. F. Lorenz secured a moderate appropriation and began service work for the institutions of the state. This valuable and educational activity consumed all his time and all his energy until he was called to military service six months ago.

The State of Illinois has been one of the most generous of the states in its treatment of the insane and other dependents and defectives. In comparison with others, her appropriations seem munificent, and the management of her institutions are not beset by those harrowing restrictions which are so heavy upon the already almost breaking endurance of the friends of the insane.

Even in the matter of research the legislature of the State of Illinois has been liberal and the administration has been appreciative of the pos-

sibilities of investigations in the cause, the cure, and the prevention of the insanities. In 1907 when the Code of Charities passed the legislature, \$25,000 was appropriated for the equipment of the State Psychopathic Institute which was located at the Kankakee State Hospital. A suitable building was devoted to the laboratory, and a director was appointed who still occupies the same position. Unfortunately, however, the energies of the director have been devoted to organization, standardization and unification of the service of the State Hospitals rather than to investigations into the causes or possible cures of the diseases which bring the 14,000 inmates of the Illinois State Hospitals into custody. The appropriations for the institute have, however, grown from \$4,000 a year in 1907 to \$20,000 a year in 1916. But the appropriations have not been expended and very little research work has been done.

It is extremely unfortunate that the institute is located at Kankakee far from libraries, far from other organizations interested in research, and far from the optimistic spirit of educational institutions. The subject of insanity is always depressing and more so in a community where the optimism of education and of young vigorous students is absent. At the present time there is at Kankakee no one except a chemist at work in the Psychopathic Institute and his work is largely confined to service for the institutions of the state.

The State Psychopathic Hospital should be removed to the Chicago State Hospital, or better still to some suitable place in the City of Chicago itself. The director had this end in view when he obtained permission from the Board of Commissioners of Cook County to move his institute in the winter of 1915-16 to the Psychopathic Hospital connected with the County Hospital.

#### *A Private Research Laboratory in the Psychopathic Hospital.*

In the autumn of 1914 Mr. George E. Fuller placed a small sum of money each month at my disposal for research into the cause of dementia praecox, and early in the spring I was fortunate enough to secure the assistance of Dr. Julius Retinger to conduct some biochemical investigations which seemed to me indicated. Dr. Adam Szwajkart, Superintendent of the Psychopathic Hospital of Cook County Hospital, very graciously and helpfully co-operated in this investigation and not only placed the laboratory rooms at my disposal, but secured suitable equipment and supplies from the County Hospital and an abundance of patients from his wards. In a very small and meagre way this laboratory was kept at work for nearly a year and some progress was made in surveying the physical condition of dementia praecox patients and seeking out the sources of disturbances which might account for the mental and physical progress of the disease toward deterioration and dementia. Unfortunately, however, subsidies were withdrawn and the laboratory was closed on the first day of April, 1916. The equipment used was, however, left in the institution in the hope that

some use could be made of it in the future. During the two years of this private investigation more than fifty articles were published upon the various aspects of dementia præcox, though they contained no very great amount of systematized observation and were not perhaps as instrumental as they were designed to be in solving the problem.

*A Co-Operative Research Laboratory by Contract.*

In the summer of 1915 Dr. H. Gideon Wells, the Director of Medical Research of the Otho S. A. Sprague Institute, a six-million-dollar foundation, in a casual conversation, gave me to understand that the Institute was founded with the purpose of investigating the cause of the insanity of youth as one of its principal motives. He said funds were soon to be at hand to organize a research upon a liberal basis, and that while it was contrary to the policy of the Institute to invest money in buildings, the time seemed to them ripe to begin the research into dementia præcox if a suitable building and suitable hospital facilities could be provided without expense to the Institute.

It appeared to me that he favored the idea that the research should be made in buildings to be supplied by the Board of Administration of Illinois and to be equipped as a hospital at the expense of the State. The Institute on its part would furnish the research men and conduct the scientific work. Without any formal authorization he seemed to favor my undertaking the bringing about of some sort of an understanding between the Institute and the Board of Administration of the state.

My great desire to further research into the cause and possible cure and prevention of this disease lead me to approach various members of the Board of Administration on the subject, and especially Dr. George A. Zeller, the Alienist of the Board. I gave him as full an account as I possessed of the resources of the Sprague Institute, and its motives as had been vouchsafed to me by Dr. Wells and I urged by every argument possible from my standpoint the desirability of such a co-operative research as the combined resources of the Institute and the State would afford. After this matter had been presented to the superintendents of the various State Hospitals at a meeting in Kankakee, the Board of Administration of the State of Illinois, appointed Dr. George Leininger of the Chicago State Hospital and myself to act as a committee to bring about a formal understanding with the officers of the Institute.

After visiting the Chicago State Hospital and looking over the buildings with this committee, Dr. Wells requested me to prepare memoranda of contract with the idea of using a certain fireproof building selected by us for research purposes on the grounds of the Chicago State Hospital. This contract as modified and executed is as follows:

April 3, 1916.

Memorandum of an agreement between the Board of Administration of the

State of Illinois and the Trustees of the Otho S. A. Sprague Memorial Institute of Chicago relative to research on dementia praecox.

PREAMBLE

The Board of Administration of the State of Illinois, known hereafter in this memorandum as the Board, or as the Board of Administration, was organized under the Code of Charities by act of legislature in 1907, and among other powers and duties was directed by that code to promote research into the causes of mental and physical defects with a view to cure and ultimate prevention.

The Otho S. A. Sprague Memorial Institute, known hereafter in this memorandum as the Institute, or as the Sprague Institute, was organized in 1911 under the laws of the State of Illinois as a corporation, not for pecuniary profits, with the purpose and object of "the relief of human suffering." The Trustees and officers of the Sprague Institute, in executing the trust placed upon them, are desirous of undertaking researches into those youthful insane persons who are usually termed dementia praecox patients, with the hope of discovering the cause or causes of this disease and some means of relief, of cure or of prevention.

The interests and objects of the Sprague Institute and the Board of Administration are in this matter so identical that they mutually desire to co-operate and as a plan of co-operation submit the following memoranda, to which they severally subscribe:

MEMORANDUM I

The Board of Administration undertakes to furnish for the use of the Sprague Institute a building on the grounds of the Chicago State Hospital, known as Cottage Ward 12, which is a one-story structure approximately ninety-six feet long and forty feet wide. The Board undertakes to maintain this building and keep it in repair during the period of this co-operation, barring loss by fire or water, supplying it with water, heat, light, electricity and local telephone service gratis. The building is to be occupied and used by the Institute as a research ward of from ten to twenty beds for dementia praecox patients, with adjoining examining rooms and laboratories for research on dementia praecox. This ward to be known in these memoranda as the research ward.

II

The Board of Administration undertakes to maintain in this research ward and care for these patients, providing them with the regulation food, clothing, bedding and all other material supplies, as well as offering them the service of the equipment of the Chicago State Hospital bathrooms, operating rooms and X-ray service. The Board will furnish one pupil nurse and continue the janitor service of the building and the care of the grounds in the same manner as it has done while occupying the ward.

III

The Board of Administration undertakes to place in said research ward any desirable and suitable patient in the Chicago State Hospital, or any one from any other State Hospital under its charge for the purpose of observation and research; and always, however, provided that such action shall be consistent with the wishes of the friends of such patient and with the further provision that all transportation expenses and other expense connected therewith shall be to the charge of the Institute itself.

IV

The Sprague Institute undertakes to put the building offered by the Board of Administration in order and repair at their own expense and begin research work on the grounds of the Chicago State Hospital within twelve months of the date of the exchange of these memoranda.

The Institute undertakes to maintain in the research ward one medical officer

at least, who shall be a licensed practitioner of medicine in the State of Illinois and certified by the Civil Service Commission of the state as eligible to appointment in the clinical service of the Board of Administration; or, in lieu thereof, a member of the resident staff of the Chicago State Hospital designated by the managing officer will be in charge of and responsible for the ordinary medical and physical care of the patients in this research ward.

## V

The Sprague Institute undertakes to care for the patients in the research ward with all due professional skill. All extra service, unusual remedial measures, whether of a medical, dental, hydrotherapeutic or other sort, which shall be prescribed for the patients in the research ward, shall be at the expense of the Institute, excepting only such services as are provided in memorandum II.

## VI

Recognizing that medical and surgical emergencies are likely to arise even in so small a number of dementia praecox patients as this research ward accommodates, the Board and the Institute undertake to co-operate through the managing officer of the Chicago State Hospital and the officers of the Institute, in meeting such emergencies when they arise in order that the interest of the patient may be guarded and the credit of the State Service and the reputation of the Institute be preserved. The management and supervision of Cottage Ward 12, as heretofore, remains under the jurisdiction of the managing officer of the Chicago State Hospital, excepting in the research work.

## VII

The conditions of this agreement shall begin when it has been accepted by the proper officer of the Board of Administration and by the proper officer of the Sprague Institute, and it shall remain in force for a period of ten years, unless the objects of this agreement shall have been attained at an earlier date, or unless either party withdraws after giving at least one year's notice. Withdrawal with less than one year's notice can be accomplished only with the full agreement of both parties to this agreement.

(Signed) FRED J. KERN, President.

For the State of Illinois Board of Administration.

(Signed) FRANK BILLINGS, President.

For the Board of Trustees of the Otho S. A. Sprague Memorial Institute.

The original of this contract was presented by Dr. Wells in December, 1915, to the Board of Trustees of the Sprague Institute and approved by them. Dr. Wells informed me at that time that two members of the Sprague family and of the Board of the Institute volunteered to add to the resources of the Institute any such amount as might be found necessary to initiate and to conduct the research work during the first year if the resources of the Institute were not adequate for same.

When the memoranda had been signed by the President of the Board of Administration, and the President of the Sprague Institute on April 3, 1916, Dr. George Leininger, the Superintendent of the Chicago State Hospital, vacated the building which had been set aside for research purposes, and that building remained vacant for several months. During these months no effort was made toward fitting it up as provided for in Paragraph IV of the contract, and patients were moved back into the empty building again when the overcrowded condition of the Chicago State Hospital made more room absolutely necessary.

It will be seen from this contract that the Institute undertook to begin work within one year from April 3, 1916, that is before April 3, 1917.

My interest in this matter was so great that in January, 1917, I made inquiry of Dr. Lewellys Barker, one member of an advisory committee of the Institute and dean of Johns Hopkins University Hospital, relative to the progress made, and the conditions under which the work was proposed, and I frequently spoke to Dr. H. Gideon Wells, the Medical Director, but I obtained no information whatever, except vague indications that the research was to be abandoned, and the contract with the State of Illinois allowed to lapse.

It seemed to me that the needs of the 130,000 dementia præcox patients in the custody of the several states and the annual increment of 15,000 dementia patients committed each year to an absolutely hopeless custody with this disease, demanded some activity, even if the object of the Sprague Trust was not to be realized at the present time.

It became obvious in January, 1917, that the funds of the Sprague Institute were not to be used for research into the cause of dementia præcox. My own survey of the literature of medicine did not discover any place in which adequate, vigorous, purposeful, rational investigations were being made designed to help 130,000 dementia præcox patients in the custody of the 400 institutions for the insane in the United States. It seemed lamentable that our rich country could spend more than \$26,000,000 annually for the absolutely hopeless and pessimistic custody of these patients, without anywhere furnishing a place and provision for hopeful research.

#### *The Laboratory of the Psychopathic Hospital. Cook County Hospital*

I was allowed the privilege of talking this matter over with the Hon. Peter Reinberg, President of the Board of County Commissioners of Cook County. His broad, social horizon and his deep sympathy for the adolescents who pass through the Psychopathic Hospital and those who are picked up by the police for delinquencies, gave me great hope that the county might provide an opportunity for the study of these patients, with the hope of saving not alone the \$26,000,000 a year to the State treasury, but the misery and woe of the 130,000 families from which these patients have been snatched by disease.

In February, 1917, in company with Mr. W. B. Freiberger, the Chairman of the Finance Committee of the City Club, and with Dr. Adam Szwajkart, the county physician, I went before the Finance Committee of the Commissioners of Cook County and presented the preceding history in brief, and begged for a suitable appropriation to open a laboratory for research in the Psychopathic Hospital. In this matter the support of Dr. Szwajkart, Mr. Freiberger and the President of the County Board resulted in the appropriation of \$7,000 for three laboratory men for the coming year. Unfortunately when this matter was brought before the full Board the following Monday, the amount was cut down to \$4,400 and two men.

Only a week later I had an appointment to appear before the Board of Administration of the State of Illinois. I presented the matter again to this Board and asked that they assign me from among their clinical staff one physician and one stenographer and typewriter. They responded to this appeal by sending me Dr. Walter Ford of the Psychopathic Institute to report for service in March.

The Warden of the County Hospital and the Superintendent of the Psychopathic Hospital allowed me the use of the fifth floor of the Psychopathic Hospital for laboratory rooms, and a small ward accommodating ten patients. This floor was originally designed and fitted up with hydrotherapeutic apparatus. Two rooms each containing two large bathtubs were fitted up with a laboratory table over each tub. The gas, water and electric service for each of these tables was brought down from the ceiling. Other stands and tables were provided, thus fitting up one bathroom as a bacteriologic laboratory, the other as a physiological laboratory. A small room had already been equipped as a chemical laboratory and a treatment room was improvised for blood examinations. A small toilet room was equipped for ophthalmologic examinations. The large treatment room which was about 16x32 feet was utilized as a library and office and a dressing room for patients and it was equipped with a dressing table upon which spinal punctures and small operations could be performed.

This equipment was all temporary and was regularly employed about the hospital.

The necessary equipment was furnished through requisitions made by Dr. John Nuzum, Pathologist of the Hospital, from an appropriation of \$4,000 previously made by the County Commissioners. The equipment was in and the laboratory work was begun the middle of April with a staff consisting of Julius Retinger, Ph. D., biochemist; Horry M. Jones, Ph. D., bacteriologist; Edward S. Blaine, M. D., roentgenologist of the County Hospital (all in the pay of Cook County); Herman Campbell Stevens, Ph. D., M. D., psychiatrist; Harry Henderson, morphologist of the blood; Leola Sexton, A. B., re-education and employment.

On the evening of the 18th of April the opening of the laboratories was announced to which the faculty of the Psychopathic Hospital was invited, the warden and psychologists of the County Hospital and a number of practicing psychiatrists in the city. The director read his report of the work already accomplished, and of the object, intention and purpose of the laboratory. It was noticed at once that opposition had arisen to this research work which was clearly presented by Dr. Sidney Kuh, a member of the staff of the Psychopathic Hospital. This attitude has not been changed during the year.

The director did not receive his official appointment until September. This fact may have resulted in some inefficiency in the conduct of the research work.

Between the 1st of April, 1917, and the 1st of January, 1918, twenty-nine patients were received into the research ward of ten beds for examination, study and treatment. Ten of these patients were removed by their parents or friends, or were discharged because they were not cases of dementia praecox. Ten patients remained in the ward on December 31st. Nine patients have been discharged relatively recovered or recovered with defect. Four patients remaining in the ward have been subjected to treatment after thorough examination, and two of these patients have failed to recover or to improve so that they might be discharged after more than three months of treatment. The remaining six patients who have not yet fully submitted to treatment are under examination.

*Official Annual Report*

The report of the director to the Superintendent of the Psychopathic Hospital and to Dr. John Nuzum, the Pathologist of Cook County Hospital, was made on December 1st and follows herewith:

Dr. Adam Szwajkart, Superintendent, Psyehopathic Hospital.

Dr. John Nuzum, Pathologist, Cook County Hospital.

The research laboratory of the Psyehopathic Hospital was established by the action of the Board of County Commissioners in February, 1917, when that body under the sympathetic and enlightened direction of Peter Reinberg appropriated \$3,300 for the salaries of two laboratory men for nine months, \$183.33 a month each. About the same time the Board of Administration of the State of Illinois ordered one physician from the Psychopathic Institute of Kankakee to report to me for service in this laboratory. Dr. Walter Ford remained on duty until he was called to the colors on June 1, 1917.

The laboratory was located upon the fifth floor of the Psyehopathic Hospital, which had been equipped as a hydrotherapeutic adjunct to the Psyehopathic Hospital. Two two-tub bathrooms were fitted up as laboratories by placing temporary laboratory desks above each of the tubs and supplying these desks with gas, electricity and water from the attic. In this way the rooms were not defaced. The small chemical laboratory had been located on the same floor and fitted up by me two years previously with a considerable amount of equipment. The large south treatment room was used as a reception room and examining room for patients, a library and a room in which mental and intellectual tests were carried out. It also held the desk and case for the histories and records. A dressing table and operating table was added in order to make spinal punctures and do surgical dressings.

The laboratory was formally opened on April 18, 1917. The warden, the superintendent, the pathologist and the attending staff of the Psyehopathic Hospital were invited to this opening.

Dr. Julius Retinger was appointed biochemist, Dr. Horry Jones, ba-

teriologist, both in the pay of the county. Dr. Walter Ford, the psychiatrist, was in the pay of the State. Dr. Herman Campbell Stevens volunteered his service as psychologist. James Henderson was engaged as blood morphologist on a small salary provided for by a research fund. Miss Leola Sexton generously devoted half a day every day in the week with the patients, conducting re-educational employments, buying apparatus at her own expense. A laboratory servant was engaged with private funds.

When Dr. Walter Ford was called to the colors the services of Paul Headland and Amelia Wood, both junior medical students, were secured through private resources. They acted as house physicians and assisted in the laboratory work. Walter Hart spent six weeks in the laboratory studying the surface tension of fluids in dementia praecox. In September Horry Jones left the service of the laboratory and his place was supplied in the appointment of Enrico Ecker.

The large treatment room on the north end of the fifth floor, similar to the office room at the south end, was fitted up as a ward with ten beds. During the last seven months the average number of patients under examination and treatment has been seven per day. They have been in such close proximity to the hydro-therapeutic bath rooms that they have been given a shower bath twice a day and thus kept in excellent condition in spite of the restraints of their confinement. It is difficult to express adequate appreciation for the co-operation of Dr. Szwajkart, the superintendent; Miss A. B. Sands, the head nurse, and Dr. Nuzum, the pathologist, in carrying on this work in temporary quarters and under novel and often embarrassing conditions. The patients have been kept in good spirits and tactfully employed by methods introduced by Miss Leola Sexton and seconded by Miss Gertrude Ohlmacher, who voluntarily served the laboratory during the months of June, July and August. During the month of October the local Society for Mental Hygiene contributed to an extension of this employment and has instituted gymnastic training.

The plan of my research work, for which this laboratory was established, was published *in extenso* in the Lancet Clinic of Cincinnati on November 13, 1915. Between March 14, 1917, when the first patient was examined and November 20, when these statistics were closed, twenty-nine different patients had been received in this research ward. Ten of these patients are still under examination and treatment. Each one of these patients was accepted with the presumption that he suffered of dementia praecox. One patient, Arthur R————, proved to be a case of alcoholic psychosis and he was discharged recovered and has since remained well. Another patient, Arthur C————, proved to be a case of manic-depressive insanity. He was discharged on June 3rd, apparently completely recovered and he has since remained well at work.

Nine of the twenty-nine patients were removed from the research laboratory either by their parents or by their physicians before any con-

clusive examinations were completed, or when completed, treatment was refused.

The ten patients remaining to be accounted for have been submitted to conclusive examinations and two of them have been submitted to treatment, but have not sufficiently recovered to be discharged. The eight remaining patients have been discharged either as cured or as greatly improved. Two of these patients recovered after the simplest form of medication which we have in use. Both of them are still well and at work after four months at home. The six patients who were submitted to the most radical treatment, appendicostomy, and irrigation, five hours after the last meal of the day, have recovered without marked defect. Three of them are at work for wages and three of them have been discharged for a period of less than four weeks.

Out of the ten patients still in the hospital three have submitted to appendicostomy, but have not had time to recover or at least recovery is not sufficient to allow their discharge.

Three patients have been in such financial condition that they have paid for their hospital services at the rate of \$10.00 a week for periods of eight weeks or less, so that the county has received \$230.00 from this source.

It may not be amiss to recount the examinations undertaken and accomplished. Twenty-eight different procedures were thought desirable and they are set down with the number of such examinations completed.

1. The history of the patient (22).
2. The physical examination of the patient (25).
3. The mental examination of the patient (13).
4. The intellectual examination of the patient, Yerkes, Binet and Rossolimo (20).
5. Special ophthalmoscopic examination (9).
6. X-ray examination of intestinal tract (147).
7. Special chemical examination of the urine (33).
8. Special bacteriological examination of the urine (1).
9. Chemical examination of the stools (13).
10. Bacteriological examination of the stools (33).
11. Morphology of the blood (98).
12. Blood serum examination (291).
13. Antitryptic examination (1).
14. Blood cultures (3).
15. Ca estimation in the blood serum (10).
16. pH examination (8 and more).
17. Spinal punctures for various purposes (many on 20 patients).
18. Spinal fluid Wassermanns (567).
19. Spinal fluid pressure examination (many on 20 patients).
20. Spinal fluid Lange (147 and others).
21. Spinal fluid Nonne (20 patients).
22. Blood pressure adrenalin tests (10 patients).
23. Photographs taken (12 patients).
24. Special heart examination (8 patients).

25. Intravenous injections of normal salt solution (10 patients, 46 injections).
26. Glucose intravenous injection (10 patients).
27. Appendicostomies (surgical staff County Hospital), (7 patients).
28. Miostagmin studies (1 series on several patients).

During the week of July 10-14, 1917, the Alienists and Neurologists of America met in Chicago and four members of the laboratory staff read papers which were discussed, and three of them were published in the Proceedings of the Society. A number of alienists, members of this Society, visited the laboratory rooms and expressed an active interest in the research work, and on July 13th organized a society for the study of dementia praecox. The principal function of the society is the establishment of a journal to be known as Dementia Praecox Studies.

Since the first of October the laboratory has been without a representative of the Department of Public Welfare of the State of Illinois, although the director and the superintendent of charities promise a physician as soon as a suitable man can be obtained by them.

Individuals interested in the work of the Lunacy Commission of New York invited your director of research, at their expense, to visit New York and present the plan of research and the prospect of successful investigations with a view to the cure and prevention of dementia praecox. The subject of a co-operation between the Board and this laboratory was discussed.

It is the hope of the director that a plan for a co-operative research work in the Psychopathic Hospital may come from a conference between the Boards of Control, the Department of Public Welfare and other interested organizations early in the year.

In nine months progress has been made toward the solution of the dementia praecox problem.

BAYARD HOLMES, B. S., M. D.,

Director of the Research Laboratory, Psychopathic Hospital.  
Dated Chicago, November 30, 1917.

#### *Summary of Reports and Results*

The director had a definite plan in view in the initiation of this research work into the possible cause of dementia praecox. It has been fully stated in various publications under the head of Dementia Praecox Studies. The outline of the histories to be taken, the physical examination to be made, the various studies of the blood, the urine, the feces and other secretions and excretions were made and posted. Unfortunately the amount of routine work necessary to carry on these studies was too great for the small faculty, especially as we were without any laboratory assistants or helpful students. The result is a fragmentary study of a few events wholly unsatisfactory from every possible standpoint except that of therapeutics. The

remarkable improvement of nearly half the patients under observation and treatment for this disease is unusual and gratifying. It was found necessary to send two patients who presented no evidence of eecal stasis to the State Hospital after the milder methods had been instituted without complete recovery. We did not seem warranted in performing appendicostomy and irrigating the eecum in patients where eecal stasis had not been demonstrated.

One patient upon whom eecostomy had been performed in September, 1916, was kept in our laboratory for nine months. But his condition, though much better than when the operation was performed, was unsatisfactory and he was sent to the Chicago State Hospital in the month of January.

One patient, Fred Madaus, improved after appendicostomy in his physical condition, but failed to completely recover and is still with us.

In opening the laboratory work the general plan was discussed and each laboratory worker given the greatest freedom in carrying out his own part of the plan. The director having no authority until September, when he received formal appointment, was careful to give advice rather than orders. The simple arrangements of research were as follows:

1. My undertaking was to be outlined in advance by a schema in order to have a definite rather than an indefinite and hazy method.
2. All work done by any man was recorded daily in his own daybook.
3. All work or research on any patient or his materials was copied from daybook and placed in history of patient.
4. A monthly report of work and effort was to be made to the director on the last day of the month.

The following monthly reports were made by the principal workers:

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*Report of the Clinical Department*

I arrived in Chicago on Monday, March 5, 1917, as ordered by the Board of Administration, and immediately reported to Dr. Bayard Holmes, who told me of his plans for starting a laboratory for the research work in dementia praecox.

He told me that Dr. Szwajkart, head of the Cook County Psychopathic Hospital, and the County Board, had agreed to his using the fifth floor of the Psychopathic Hospital for a laboratory. The Cook County Board also agreed to hire two laboratory workers, and others were to be obtained with money from private donations. Dr. Holmes immediately got in touch with Dr. Retinger and Dr. Mellick of the University of Chieago, for the positions of serologist and bacteriologist.

The Board of Administration of Illinois was to furnish a physician to do the clinical work on the patients, and a Mr. Henderson was to do the blood morphological and urinalysis work. At the time I arrived in Chicago

nothing definite had been accomplished toward getting these men together and so for several weeks I was the only one at work.

At Dr. Holmes' suggestion, I put in several hours each day at the Crerar Library reading up the literature on gastro-intestinal stasis, peristalsis, and spasmophilia. I spent two weeks at this work before anything could be done at the Psychopathic Hospital.

On the 19th of March I began work at the Hospital and examined the first patients, which were to be used in our experiments. By the end of March I had made mental and physical examinations on and diagnosed the first six patients. It was necessary to observe these patients, talk to them, interview their relatives, and write a history on each case. The case histories are kept in folders and added to from time to time as is done in State Hospitals. The cases are being studied intensively and a great deal more data is obtained than is done in State Hospitals.

My work consists in getting the following: Anamnesis, complete physical examination, complete mental examination, x-ray examination and adrenalin blood pressure test. The following patients have been given these tests: Arthur Cullen, Joseph Schraw, Edward Evenson, George Johnstone, Edward Burke, and Harry Mowshine. The following have been examined, but not finished: H. O. Frink, Anton Enorryss, Jergen Johansen, Thomas Doyle, James Cankar and Gilbert Gooley. One great hindrance to the work is the fact that it has not been possible to get a separate dormitory which can be used exclusively by the cases under observation. It is necessary, therefore, to search for these patients whenever they are to be examined. Four were sent away before their examinations were completed, and one of those still here can not be used because of the objections of an attending man (outside physician). One case taken home has been returned and is still being examined.

In addition to the work already mentioned I have made several Wassermann tests, and have taken blood specimens from patients for Dr. Retinger's use. It is the custom now to do the Wassermann tests for the Psychopathic Hospital as the tests done by the County Hospital Laboratory, it is said, cannot be relied on.

On the first of April my father died suddenly and since then it has been necessary for me to dispose of his business and straighten out his affairs. This prevented me from doing work here the first week of April, but I had already been able to keep a list of patients ahead for the others to work on.

The organization here really got under way about the first of May. As Dr. Mellieck failed to join the staff, Dr. Jones of the bacteriological department at Washington was obtained. He was unable to do any work until the first of this month because of a lack of equipment. Dr. Holmes has been impatient to start work, but has found it slow going. There is some opposition here among the visiting staff men. Dr. Szwajkart and the

resident physicians—Dr. McCann and Dr. Finsen—have shown us every courtesy and have done everything possible to help us.

As the Psychopathic Hospital is crowded it has been found difficult to find dormitory room so as to permit our patients to remain here from week to week, and until the Cook County Hospital gives up their medical wards here, the crowded condition will remain. The completion of two wings on the County Hospital main building will probably relieve the situation.

May 7, 1917.

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Since my previous report was made the clinical work has been on an increasing number of patients. There have been added six new cases which were thought to be of sufficient interest to add to our list. Of these only one was taken out of our hands, and he was very dissatisfied with the confinement and prevailed on his folks to take him out to Elgin, as he thought that he would be given a parole of the grounds if he was there.

Of the other five patients three live at home and report regularly for examination. This arrangement keeps them in a much more contented condition of mind, but would be impossible, of course, in dealing with any but the mildest cases.

Four more have been taken to the x-ray department and two, both cases of catatonic dementia præcox, gave evidence of a cecal stasis. There have been three cases of a total of eleven examined in which the appendix was radiographed.

Owing to lack of nurses it has not been advisable to start the active treatment of all cases of dementia præcox with saline solution intravenously. One case has, however, been given two injections according to the method used by N. Ishida, with no permanent results so far. The method will be given further trial.

As I have received orders from the war department to report for duty at Fort Sheridan as an officer in the Medical Reserve Corps, I will be unable to continue the most interesting work which has been started here.

May 29, 1917.

W. A. FORD, M. D.

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#### *Report of Bacteriological Laboratory*

Equipping laboratory for bacteriological work began on April 10th.

Supplies, chemicals and apparatus were requisitioned on various dates as needs for same were anticipated.

Chemicals and apparatus were obtained from three different sources at the hospital, namely, the drug room, store room and pathological laboratory. Temporary use is being made of apparatus and supplies borrowed from the bacteriological laboratories of the University of Illinois, and the

Northwestern University Medical School. Some were bought directly from hardware and scientific supply houses and a few pieces of apparatus not found at any of these places were made in the laboratory, or machine shop. Sufficient apparatus was collected to begin preliminary bacteriological examination of patients and controls May first. Arrangements have been made and apparatus provided for making photographs of each patient.

During the coming month it is planned, first, to prepare suitable quantities of the usual bacteriological media; second, to begin qualitative and quantitative comparisons of the stools of dementia praecox and normal individuals, and third, to attempt to ascertain some of the limiting or controlling factors responsible for any bacteriological differences which may be observed.

May 1, 1917.

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During the past month (May first to June first) suitable quantities of the usual bacteriological media have been prepared, including plain broth, plain agar, plain gelatine, litmus milk, 10 cc. tubes of normal salt solution, Ringer's solution, Endo's medium, dextrose, lactose and saccharose broths, and the histidine medium used by Bertrand and Berthelot in the isolation of the *B. aminophilus intestinalis*. The Dale and Laidlaw apparatus has been set up and tested out for demonstrating the presence of histamine in cultures and in stool extracts. A quantitative comparison of stools of different individuals and of different stools of the same individual has shown that the number and variety of living bacteria per gram of stool is markedly affected by the hydrogen ion concentration of the stool. The reasons for the variations in the hydrogen ion concentration in different stools are perhaps important in some ways; but since this variation was found in different stools of the same patient, its significance is apparently not vital to the problem in its present stage.

During the coming month it is planned to devise a routine method for the isolation of the *B. aminophilus intestinalis* and the organism isolated by Mellanby and Twort. The method will then be used in the examination of stools of dementia praecox patients and of normal individuals. The ultimate object is, first, to isolate any organisms which will produce histamine when histidine is used as a sole source of amino acid; second, to identify such organisms, and third, to discover what differences, if any, are to be seen in the stools of normal controls and dementia praecox patients with reference to such organisms.

May, 1917.

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During the month of June bacteriological examinations of stools were continued. Examinations were made by inoculating stools of patients and controls directly into the histidine medium used by Berthelot and Bertrand.

After five days transfers of each of the growths obtained in such a medium in aerobic and anaerobic conditions were inoculated into a second tube of the same medium, and after five days the growth obtained was then plated out on Endo's agar medium. The various types thus obtained were then inoculated in pure culture into the histidine medium and after 1, 2, 5 and 7 days the cultures were tested by the Dale and Laidlaw method for the presence of histamine. The type of organism described by Berthelot and Bertrand was finally isolated and studied morphologically and culturally, and identified as an organism resembling *B. mucosus capsulatus*, but differing from the latter in its ability to decarboxylize the amino acid histidine. Strains were isolated which grew readily in the histidine medium, but which apparently did not produce histamine in sufficient concentration to be detected by the method employed.

Histidine is not obtainable on the market at present, and for this reason it became necessary to make the histidine in the laboratory. Two litres of blood paste gave a yield of a little less than a gram. The product was then identified by its crystalline structure, by a roughly quantitative Pauly reaction, and by incinerating a portion on a glass slide (to prove the absence of inorganic material).

During the month of July it is planned to make quantitative bacteriological examinations of patients and controls to determine if such stools show a difference in numbers of organisms yielding histamine when cultured in histidine. It will also be necessary at various times to make histidine to be used in this work.

June, 1917.

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The bacteriological work planned for the month of July required a larger quantity of histidine than was available at the time. However, it was possible to make further examination of the biological characteristics of the *B. animophilus intestinalis* isolated last June. It was found that this organism grows well in the medium of Berthelot and Bertrand in a hydrogen ion concentration of pH = 5.5, and that the medium returns in forty-eight hours to a reaction of pH = 8.2, at which reaction growth and metabolism apparently cease. By growing the organisms in such a medium, to which had been added .002 of 1 per cent of cresol purple, it was found possible, by adding sufficient acid each day, to keep the cultures from becoming too alkaline, and, therefore, to increase the yield of histamine by two or three hundred percent, in a medium containing as little as .1 of one percent of histidine. With larger percentages of histidine the yields should be correspondingly greater.

The methods for making histidine-hydrochloride as described in various text-books are far too brief to enable one unfamiliar with the process to obtain satisfactory yields and a pure product in the first attempt. The process was repeated twice this month, and the loss of histidine due to the

presence of ammonia salts, and to the various processes of dissolving and precipitating, was more carefully controlled. A process was finally worked out by which it is possible to obtain a yield of 10 g. of histidine-hydrochloride from two litres of "blood-paste." Definite acid and alkaline reactions used in filtering, precipitating, dissolving, etc., definite amounts and concentrations of reagents required were recorded, and where necessary, precautions against the usual errors and difficulties encountered were pointed out and reasons for these given.

During the coming month it is planned to continue the quantitative examination of the stools of controls and of dementia praecox patients with reference to the *B. aminophilus intestinalis* type of organism, and to apply different methods of cultivation (such as high and low incubation temperatures, aerobic and anaerobic conditions, various media, etc.), for organisms hitherto not discovered by the ordinary methods employed in the study of intestinal bacteria.

July, 1917.

HORRY M. JONES, Bacteriologist.

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*Bacteriological Work Done for the Month of October, 1917*

Following the preparation of all media necessary for the isolation and identification of intestinal organisms as, for instance, Endo Russell and Drigalski-Conradi's media, a study of intestinal organisms of dementia praecox patients was begun with the colon group as main object of investigation. This group of organisms was especially taken under consideration because of recent findings of Levin (*Jour. Lab. and Clin. Med.*, Vol. II, No. 11, 1917), who isolated a soluble thermostable poison, a toxin-like body of unknown chemical constitution from *B. Coli* and also on account of my own observation with similar toxic compounds of *B. paratyphosus B*. Further evidence as to the presence of toxic compounds, possibly of bacterial origin, is found in the proteose work of Dr. J. Retinger. To this end a series of organisms were isolated from the stools of Ch. Messer, from the cecal contents of Harold Egan, cecal contents of Fred Medaus and my own stool as control.

The organisms of Ch. Messer were subjected to the usual bacteriological examination and in one instance most of the isolated organisms were found to be liquifiers. The differential media were Endo Russell, milk, dextrose, lactose, saccharose, glycerine and nannite broths. Indol formation and gelatin were tried. The characteristics of these strains were recorded on a chart. Strains six and nine were grown on special toxin broth made of beef infusion for seven days and killed with 0.4 per cent phenol, filtered and injected intraperitoneally into guinea pigs in doses of 3-5 cc.

The animals show definite signs of prostration and slight diarrhea. Strain six was grown to twenty-four hours on special broth, filtered through

a Berkefeld candle. Two cc. of the sterile filtrate was injected into the ear vein of a full-grown rabbit. The reaction on the animal was remarkable in that it produced a severe diarrhea and prostration. The animal recovered.

The strains of H. Egan were partly saccharose fermentere. The serum of this patient was used to agglutinate ten of his own organisms. Strain sixteen was found to be agglutinable 1/10 and strain twenty-four showed spontaneous agglutination.

This agglutinating property was not constant in strain twenty-four. Some of Egan's strains were used for the production of toxic compounds, strains 16, 22 and 24. They were grown in special broth for seven days, killed with 0.4 per cent phenol, filtered and injected intraperitoneally into guinea pigs. The animals were all prostrated. Most of the guinea pigs died within three days following the injections. The control animals with sterile broth remained normal.

The work requires a great many animals, especially rabbits, as they react more uniformly.

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November and December, 1917.

During the last two months I continued the study of the colon group organisms isolated from the cecum of Egan, Medaus and Kovar in regard to their general characteristics. The study of possible production of soluble toxins had to be discontinued, due to lack of experimental animals. A study of the production of methemoglobin was begun with members of the colon-typhoid group, and especially with coli isolated from our dementia praecox patients. The work was carried out *in vitro* by growing the organisms in artificial media and addition of Berkefeld filtered hemolyzed human cells in distilled water. The control tubes all showed an oxy-hemoglobin spectrum, while the other tubes 24 reduced oxy-hemoglobin to hemoglobin. One tube containing *B. typhosus* was slow in dissoeiating this compound. Continued growth failed to produce further dissociation and heavy growth precipitated the compound, making spectroscopy impossible. Laek of ammonium lactate and asparagin obliged temporary abandonment of the problem. The problem was again started and the filtration of the hemolyzed cells omitted. This was done on account of the reoxidation of the hemoglobin through the Berkefeld filter. Partial anaerobiosis was also undertaken, but without much sucess. During December another problem was attempted in order to investigate whether intracecal administration of sugars would partly eliminate intestinal putrefaction leading to chronic intoxication of our patients. Laetose and saccharose were proposed for this work. Kovar received daily 20 gms. of lactose in 75 cc. of distilled water intraceally. A week after the administration of the sugar patient's stools were of normal consisteney, while prior to this treatment patient was chronically constipated. There were signs of general improvement, as clearing of skin and eyes, more response, but after a month of treatment no striking changes

took place. Medaus was also given the same treatment. Egan also received lactose, while Moran served as control and was injected with saccharose.

Two and one-half liters of gold (colloidal) was prepared for Lange's test and the usual Wassermann's done for Dr. Weightman.

ENRICO ECHEI, Ph. D., Bacteriologist.

January 1, 1918.

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*Report of Serologic Work*

The work was started on April 1, 1917. Part of the equipment which was left in the laboratory a year ago disappeared in some unknown way so it had to be replaced. Other things had to be procured. Since it takes a very long time for getting things through the County Purchasing Department, part of the chemicals and apparatus were ordered from the stores directly and covered by private funds. To date \$33.56 have been spent in this manner.

The manipulation of getting things together was the cause for a great delay in actual work, which started only on the 20th of the month.

The work was begun with the Abderhalden Reaction. This method is being utilized by us to determine if possible the exact location of the causative lesion, if there is any, and the progress of pathology in dementia praecox. When installed in the laboratory I brought with me 29 different tissues—substrates mostly from the brain. As our work is not being limited only to the central nervous system, I started in preparing new substrates in the new manner. Every tissue is first watered in tap-water until no blood is washed out, which process takes about twelve hours, afterwards it is cut into pieces about the size of one-inch cubes, and cut on a freezing microtome, in  $200 \mu\mu$  thickness. The pieces in which the vessels are surely cut, are now watered again, first in tap-water, afterwards in distilled water, and ultimately in distilled water with a faint trace of acetic acid in order to remove the least traces of blood. Now the tissues are coagulated by immersing for five minutes in (slightly acetic) acid, boiling water. The water is decanted and the pieces extracted twice with 95 per cent alcohol ( $\frac{1}{2}$ -hour each time) and twice with ether to remove all the fats and then boiled in distilled water again, renewing the water constantly until the ninhydrin reaction is lost. Then the substrate is transferred into a sterile container having sterile water and covered with a thin layer of tolune. In this way fourteen tissues were prepared.

Besides, five cases of supposed dementia praecox were examined after the Abderhalden reaction with the 29 tissues, which I had before, that is, 145 single tests were made, not counting the controls.

It is our intention to run this test on every patient with a complete set of tissues, which most probably will amount to about fifty.

There has been no work done as yet on the complement fixation test with the exception of the Wassermann reaction. I do not now possess all the necessary reagents for the complement fixation test and because that work means a very great amount of labor I do not want to take any chances of a possible wasting of time, and I would rather wait a short time.

The work on stools which will be composed of estimation of toxicity in general and the extraction of possible toxic amines, besides that of possible albumosis and peptones, is going to start this week and promises to completely occupy my time for a while.

May 7, 1917.

MAY, 1917.

During the month of May, 1917, the following twelve new tissue-substrates for the Abderhalden reaction were prepared: Gall-bladder, kidney, ileum (about 4 inches above the valve); ileo-cecal valve (pure muscular tissue); appendix (without the sphincter part) cecum (from the lower part) about 2 inches wide and 4 inches long; vagus from the neck, all from an autopsy of a pneumonia case. Spinal cord of a rabbit, three pieces, from cervical, dorsal and lumbar region; lung from a non-tubercular, non-syphilitic case, and prostate from the same case. The tissues were prepared in the same way as described in the April report.

Abderhalden reactions were made on only five cases. It takes about  $\frac{1}{2}$  days to complete a reaction because of the number (40) of antigens used (178 test altogether counting the controls). In all the cases, as in previous experiments, the anamnesis was not known at the time of the experiment, only afterward the clinical facts were compared with the Abderhalden results.

Gooley has auditory delusions—auditory center. Mentally deteriorated—frontal association center; characteristic reaction with testicles.

Caukar is constantly confused—parietal association center. Just out of catatonia—sensory center; characteristic reaction with testicles as antigen.

Both these patients have cecal stasis, but no positive Abderhalden reaction to the cecum or even ileo-cecal valve, but a marked one to ileum.

F. B. Fiuk, with jaundice, was taken as control for brain tissues, being mentally absolutely normal and denying at the time of the test any symptoms which would account for any reaction with brain tissues (he is a senior medical student). He turned out to be in another sense a perfect control. Inquisitions revealed that after a ratbite six years ago, followed by a stay in the hospital for several weeks, he suffered for a long time with double vision which was corrected by wearing glasses and disregarding one of the pictures. His serum reacted with the visual center in the brain cortex, anterior pituitary, both cattle and human, optic thalamus and pons, giving a perfect path indicating some optic degenerative change. A positive reaction to gall bladder must account for his jaundice. The reaction to parathyroids, pancreas and liver is most probably due to swamping of

the organism with bile, while the positive kidney indicates tiredness of that organ, which is certainly overworked secreting an unusual amount of bile salts. He hasecal stasis and as in the two above described cases shows positive reaction to ileum and appendix but none to cecum. It seems as if that stasis was due to some mechanical obstruction either caused by a spasm of the sphincter of Cannon which terminates the cecum and the stasis region, or by a faulty mechanism of the Pyer patches in the ileum and appendix.

On the following days Wassermann reactions were made for the Psychopathic Hospital: on May 2nd, 16; May 9th, 43; and 5 Lange's; on May 16th, 11 Lange's, on May 22nd, 16 Wassermann's, May 23rd, 5 Wassermann's, on May 29th; 21 Wassermann's and 6 Lange's, a total of 101 Wassermann's and 22 Lange's for the month. The colloidal gold solution was prepared three times—500 cc. each day.

The work on stool was begun on May 7th. First it was attempted to obtain 24-hour specimens by giving the patient two charcoal meals, 24 hours apart and collect all the stools which came between the first and second appearance of charcoal, but for the reason that the patients are manageable only with difficulty and not being in bed can go freely to the toilet room, stools were lost. On account of that I dried some amount of stool on the waterbath until it became pulverisable and after making alkaline with Noahdil, and mixing with sufficient plaster of Paris, extracted it with chloroform in a Soxhlet apparatus until the Pauly reaction ceased to appear. The extracts obtained in that way were very colored and the coloring matter went into the dil. acid on shaking and contained a great excess of fats which interfered with further work. On that account a way was adopted which is proposed by Hawk for working out putrefaction mixtures. First the stool is distilled with steam to separate ammonia indole and its homologs, phenol and its homologs and the volatile fatty acids. From the residue oxyacids, skatole-carbonic acid and non-volatile fatty acids are removed with ether after having filtered off all of the solid materials. The residue on crystallization after concentrating gives leucine and tyrosine. The filtrate from them contains tryptophane, peptones, proteoses, and aromatic acids and all those amines which are non-volatile and insoluble in ether, both in free form or as salts. In that fraction ought to be histamine. According to that scheme two stools were started on May 24th, that of Schraw and Madaus. The work is not yet finished.

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This report covers the time from 7th of June to 1st of July.

Abderhalden reactions were made on the following patients: 1. Aug. Notbush, a patient with brain tumor from the Anna State Hospital. An attempt was made to locate that tumor after the dialysis method. That work, although not being direct work on dementia praecox patients, is used as a means for standardizing the method up to the finest points in order

to determine with certainty the connection between symptoms of the disease and certain affections of the brain.

According to the results the tumor ought to be placed in the space between the cerebellum and the optic thalamus, possibly near the corpora quadrigemina, because the former two tissues react very strongly. The reaction with the cortical centers seems to corroborate that statement because the point of crossing of the fibers running from the occipital and frontal parts lies just above the same spot. I would venture to say, basing it on my previous experience, that there must be a hypertrophy of the optic nerve with pressure on the pituitary and at least troubles with visual sensations as secondary manifestations due to changes in the occipital vision center. A positive reaction to the frontal association center is obtained usually in mentally confused and degenerated patients. Twenty-two dialyzers were used.

2. Walker, B., another patient from the Anna State Hospital suffering with dementia praecox, shows all the typical changes in the brain: parietal association, speech, and auditory centers and very profuse trouble in all the glands of internal secretion. Thirty-nine dialyzers were used.

3. Fred Madaus, dementia praecox patient, shows profuse changes in all parts of the body. Forty-one dialyzers were used.

4. Adolf Cankar, dementia praecox, shows positive reactions with the vision and motor centers, glands of internal secretion and parts of the intestine. This case shows a reaction with the vagus. Thirty-nine dialyzers were used.

In all 141 single tests were performed.

Wassermann tests for the Psychopathic Hospital were made on the following days: Thirty-five on June 13, and 11 Lange's; 18 on June 20, and 8 Lange's; 23 on June 27, and 10 Lange's—76 Wassermann's and 29 Lange's altogether. Lange's colloidal gold solution was prepared on three occasions.

The work on three stools was finished: on Madaus, Adolf Cankar, and Rabb. The histamine isolated was reprecipitated with mercuric chloride and after freeing from mercury put up into small test tubes. They all show slight coloration. Out of the three the strongest Pauly and skin reaction is given by the specimen from Adolf Cankar, the next that of Madaus, while that of Rabb does not seem to be positive at all.

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July, 1917.

Abderhalden work: The reaction on William Stroetzel (bad boy of 12) performed with 39 tissue substrates indicates only some slight changes in 1. the hypophysis and sensory area of the brain cortex possibly allied with bad vision he is suffering from; 2. reaction to intestinal parts which occur always in cases of intestinal stasis and 3. a weak reaction with liver and a strong one to the spleen. The reaction is entirely different from the ones

of dementia praecox patients. His Wassermann reaction on the serum and on spinal fluid was negative and so was the colloidal gold test.

II. Winifred Melvin, a patient with severe headaches deep in the forehead between the eyebrows. Because that pain, together with a peculiar position of the head during walking, suggested a cerebellar tumor an attempt was made to localize it. The following lines will show that this supposition was not corroborated. Forty substrates were used and the following results obtained. The reaction is positive with the corpus mammillare, the optic chiasma, the infundibulum posterior lobe of the pituitary body and all of the olfactory parts. The choroid plexus of the third and lateral ventricles also shows positive. Positive also are all those parts of the cerebral cortex, which are the beginning of fibers running just through that part of the base of the brain; that is the whole of the gyrus centralis and of the gyrus frontalis with the exception of the upper part of the pars media, part of the lobulus parietalis superior and the temporalis inferior on the mesial surface. Thus I made the statement that these must be an enlargement of one or more of the processi surrounding the sella and the sphenoid antrum connected with pressure upon the gyrus parolfactorius and the infundibulum. The patient some years ago underwent a slight operation of taking out some of the bony parts from the nasal cavity. The patient is going to be sent for an x-ray examination. Forty dialyzers were used.

In all 79 single tests were made.

One whole week was spent on preparing a new set of tissues from the brain. Charts were made with all the details of the structure and the parts desired marked. Dr. H. C. Stevens dissected them for me. They are now prepared in the well known way. There are 32 of them. The reaction on Winifred Melvin was largely with this set of substrates.

Several days in the beginning of the month were spent on preparation of the paper and chart, about the localization of brain lesions by the dialysis method. It was read before the Society of Alienists and Neurologists.

The Wassermann reaction and the Lange tests for the Cook County Court were made on the following days: July 2, 2 Lange's; July 11, 33 Wassermann's and 6 Lange's; July 18, 38 Wassermann's; July 25, 26 Wassermann's and 6 Lange's. Altogether it represents 3 days during which 97 Wassermann's and 14 Lange's were made. The colloidal gold solution was made once.

**Stools:** The work on stools in the month of June showed that they contain large amounts of proteoses. Now, because Whipple showed in numerous articles that proteoses from intestinal obstruction and closed loops are the cause of accompanying intoxication and that 100 mg. of it amply represents a lethal dose for a large dog, the isolation of proteose from all the stools was worked out.

The procedure used is the following: The stools are mixed with a large amount of water and evaporated on a steam bath, water being supplemented twice after the mass attains dryness. In this way practically

all the steam volatile substances go in the air. The residue is taken up in 500 cc. of distilled water and filtered through cheese cloth. The turbid filtrate is evaporated down to about 100 cc. and precipitated with 500 cc. of 90 per cent alcohol. The mixture full of flocculent precipitate is heated on the steam bath for about one hour and allowed to settle over night. It is filtered through paper and the precipitate extracted with water and the still turbid liquid concentrated. It contains all the proteose.

The alcoholic filtrate is evaporated down, taken up by water, and fractionated with silver.

The stools of Harold Egan and Clement Balinski are being used for testing out that method and are almost finished. That of Charles Messer is just begun.

During the month of July Mr. W. Hart came into the laboratory for temporary research work on the Abderhalden test in connection with the feeble-minded patients. He was introduced to the dialysis reaction and his work seems to give the assurance that he will soon prove to be a perfect worker.

#### AUGUST, 1917.

Abderhalden work: I. Tischard, a patient with violent mania of very short duration of disease, talking himself to absolute exhaustion. Although fifty-seven years old, he behaved and looked like a dementia praecox case of a fulminating type. His dialysis reaction shows positive to all the motor areas of the cortex of the brain and the complete visual path as in cases of dementia praecox with visual delusions. Forty dialyzers used. Patient recovered and was paroled so no more examinations could be made.

II. Charles Messer, dementia praecox, catatonic boy of 15. Only a small amount of blood could be taken so just the glands of internal secretion and the intestine were tried. He shows the usual disturbances in these glands and the ileum; the ileo-cecal valve is very strongly positive. Twelve dialyzers used.

III. Varnum Wood, dementia praecox, shows the usual changes in the motor area of the cortex indicating an irritation of the auditory center. The patient admits auditory delusions of several years standing. Of the glands of internal secretion only the thyroid and the parathyroids appear besides a weak reaction with tests. The reaction with the ileum is positive. (He has cecal stasis just as Ch. Messer has.) The reaction with the vagus is positive. Fifty-five dialyzers used.

IV. Tairka Kraninas is a patient with a brain tumor and his reaction was used for refining the technic. His reaction shows positive, the whole visual path with an especially strong reaction on the corpora quadrigemina, where the tumor was located in conformity with the clinical findings of Dr. Hassin, his attending physician. The patient is blind. Forty dialyzers used.

V. Tony Fox, headaches of dark origin. The blood of this patient did not clot regularly and gave only 30 per cent serum instead of 45-50 and

the lesion or irritation was located round the third ventricle. So I assumed that there must be a constantly dripping hemorrhage without actual clotting on account of the condition of the blood and consequently without pressure, but just irritation. Whether the primary irritation was in the third ventricle or round the cortex which also reacted very strongly, and secondary in the structures round the 3rd through the sac of the fibers, I was not able to say. Forty dialyzers used.

In all 190 single tests performed.

The Wassermann and Lange tests were only twice performed. August 8, 1917, 41 Wassermann's and 11 Lange's; August 22, 39 Wassermann's and 5 Lange's. In all 80 Wassermann's and 16 Lange's. There was much trouble in preparing the colloidal gold solution this month, which spoiled 5 times for unexplainable reasons. It was made 8 times in all.

**Stools:** Because of indications that the "proteose" found in stools contains preformed histamine in the molecule and because any heating might split it off, the stools are now extracted in the cold with distilled water with long continued shaking, filtered, the filtrate concentrated in vacuo at low temperature to the same amount of cubic centimeters as there were grams and precipitated with 5 volumes of 95 percent alcohol. The filtrate of it is worked out as before. In this way the following stools were analyzed: Ch. Messer 200 and 100 gr.—much histamine and very much proteose. Fred Madaus 10 g., V. Wood 250 g. and 130 g.; not yet finished. George Gilboy and Harold Moran not finished yet. All of them show quite an amount of proteose and some histamine.

There are indications that the alcoholic filtrate contains still some protein, which we do not know anything about yet. The work is being continued.

**Calcium estimations in blood:** The spasmatic condition of the sphincters of the large intestine in dementia praecox as demonstrated by fluoroscopy suggested a possibility of an abnormality in the calcium content of the blood in this disease. For this reason that branch was undertaken. Preliminary experiments on five normal bloods proved that the method of Lyman which I decided to use is very satisfactory, and the work on six patients was started. The experiments are not yet ready to report.

SEPTEMBER, 1917.

**Dialysis method:** John Hiti, brain tissues as in all of the cases of the motor area, i. e., the frontal area of the frontal gyrus and the middle and lower part of the central gyrus are positive with a most pronounced reaction in the middle part. Besides there are the usual positive reactions in the auditory and visual areas. The case seems to belong to the pituitary type of dementia praecox. It shows weak reactions with the hypophysis and more with pancreas and ileum. On the other hand, a strong reaction with thyroid would indicate hypofunction of this gland since no clinical evidence can be demonstrated either of enlarged condition or hyperthyroidism. He

	I	II	III	IV	V
Cortex Centers					
Vision Sensory	-	?	2	3	-
Motor	-	-	-	1	-
Frontal Assoc'n	1	-	1	-	-
Parietal Assoc'n	-	1	-	-	-
Motor Speech	-	-	-	1	-
Sensory	1	2	-	1	-
Auditory	1	-	-	-	-
Corpus Callosum	-	0	-	-	1
Pineal	-	-	-	-	1
Pituitary, Whole Human	?	2	2	3	-
Pituitary, Anterior (Cattle)	-	-	2	2	-
Pituitary, Posterior (Cattle)	2	-	-	-	-
Infundibulum	-	3	-	-	1
Dura	-	-	-	0	2
Cerebellum	-	-	-	?	1
Optic Thalamus	-	1	1	-	-
Dorsal Nucl.	-	-	-	-	-
Dentate	-	-	-	-	-
Pons	-	-	1	-	-
Medulla	0	-	-	-	-
Sp cord Cervical (human)	-	-	-	-	-
Parathyroids (Cattle)	-	2	1	-	-
Thyroid	?	2	-	-	-
Adrenals	-	-	-	-	-
Pancreas	2	0	1	-	-
Liver	-	-	1	-	-
Spleen	-	-	0	?	-
Gall Bladder	-	1	2	-	-
Kidney	-	-	2	1	-
Ileum	1	1	2	-	-
Ileo-cecal Valve	-	?	-	-	-
Appendix	1	-	2	-	-
Cecum	-	-	-	-	-
Vagus	-	-	-	-	1
Sp cord Cervical (Rabbit)	?	-	-	-	-
Sp cord Dorsal (Rabbit)	-	-	-	-	-
Sp cord Lumbar (Rabbit)	-	-	-	-	-
Testicle	4	1	-	-	-
Lung				2	
Prostate				-	

reacts strongly to the cecum which is a very rare finding. Fifty-seven dialyzers.

II. Hattie Shattuck, a feeble-minded girl with uterine showings and diagnosis of angro-neurotic edema, showing a long retardation of barium-meal in the cecum, gives positive reaction to all endocrine glands with exception of parathyroids and pancreas, weak but sure reactions with ileum, the valve and appendix and a very strong one with cecum, 17 dialyzers.

III. Charles Messer, catatonic dementia praecox, continuation of the reaction of August 8, 1917, when on account of too small a quantity of blood only a few tissues were used. The usual reaction in the motor and sensory areas of the cortex besides pons, eaudate nucleus, optic thalamus, and corpus callosum, and the reaction with choroid plexus suggests some trouble in the third ventricle. Thirty-nine dialyzers.

IV. Charles Duboky was examined as a control for the sensibility of the tissues because of diagnosis of cerebral thrombosis and expected post. The reaction pointed to a localized lesion in the angle between the frontal superior gyrus and the central gyrus in the side toward the motor area. The autopsy on 24th of September revealed an abscess in exactly the same location. Thirty-six dialyzers used.

V Harold Moran, dementia praecox hebephrenic. Very little change in the motor and sensory cortex and in the structures of the base. Rather strong reaction with the corpus callosum. The reactions with endocrine glands put this case into the division of pancreatic type. Typical reaction with the intestine, ileum, appendix and the valve. Strong reaction with kidney. Fifty-seven tissues, 206 single tests.

Stools: Harold Moran's stool was worked out to the potore isolation stage, but because of getting mouldy, was rejected.

-Charles Messer's stool was collected in the amount of 300 g. and was prepared to the same stage. It is going to be worked out further in order to accumulate material for proteose work. (His stools contain especially large amounts of it as the previous experiments have shown.)

Wassermann and Lange Tests: The reaction was conducted three times: on September 12th—25 and 16 Langes, on September 19th, 27 and 6 Langes, on September 26th, 33 and 4 Langes.

Total of 85 Wassermanns and 26 Langes.

Calcium estimation in blood. Six cases were started. The work is being continued.

OCTOBER, 1917.

*Dialysis Method*—In order to be able to diagnose the first reaction and the following progress of damage in the brain of dementia praecox patients, a number of cases with gross lesions were selected and the dialysis method tried out on them. In every case there was either an unmistakable clinical diagnosis or an operation, or an x-ray plate or an autopsy. The diagnosis was not known to me in any one of these cases until after the reaction was completed and the charts made out.

1. Siegel—Case of Dr. Bassoe (Presbyterian Hospital). No reaction in the cortex, very strongly positive, the gray matter of the cerebellum and the dentate nucleus, strong reaction with the choroid plexus of the fourth ventricle lesion in the cerebellum and affection of the fourth ventricle. Operation: large cyst in the cerebellum and the distension of the 4th ventricle. Forty-one dialyzers.

2. Mary O'Brien, care of Dr. James Herrick (Presbyterian Hospital). A few not correlated weak reactions in the cortex, strong with the visual and olfactory areas. Reaction with the chiasm and the geniculate body and optic thalamus and an exceedingly strong reaction with the protein lobe of the hypophysis. Rather strong reaction with the olfactory apparatus. Report: Lesion on the posterior pituitary with the involvement of vision and the olfactory sense. X-ray shows great destruction of the sella turcica and clinically an almost complete loss of visual field in the left eye and the sense of smell on the same side. Forty-one dialyzers.

3. Mrs. Hammerberg—Patient of Dr. Rothstein. The reaction shows positive to all the structures round the 3rd ventricle and the pituitary anterior. Clinically; internal hydrocephalus of the third ventricle. Forty dialyzers.

4. Max Kollack, Ward 4. Practically the only reaction was that with the pons, so I diagnosed tumor of the pons without involvement of the cerebellum. The clinical diagnosis was that of tumor in the cerebella pontin angle. A few days after the test the patient was sent to the throat ward, where a tumor in the naso-pharynx was found. Thirty-eight dialyzers.

5. Mrs. Gerstein (Dr. Kuh). The reaction was so situated in the cortex that a diagnosis was made of lesion in the frontal lobe on the lower frontal gyrus near the edge of the motor area. Dr. Kuh confirms it from the clinical standpoint. No operation could be obtained. Thirty-one dialyzers.

6. Hattie Guacinski (Cook County Hospital). Different diagnoses were made on this case. My reactions show most pathology in the cerebellum dentate nucleus, via the 4th aqueduct of sylvius in the corpora, quadrigemina and the pineal gland. Besides a very strong reaction in the pituitary body the corpus callosum and several areas in the frontal lobe. Although the frontal lobe was tempting me very much, I decided for tumor of the cerebellum extending up to the corpora quadrigemina. Autopsy showed against the clinical diagnosis that my findings were right. Thirty-eight dialyzers.

7. Vincent Hara, Ward 4. Shows distension of the 3rd and lateral ventricles and some changes in the cortex. He is an epileptic. Thirty-eight dialyzers.

8. Sherbarth. Dementia praecox shows the common reaction in this disease with the motor area and the lob. parietalis superior, besides the sensory areas. Forty dialyzers.

9. Baird Sisson—Epileptic (acromegaly?) does not give any evidence of hypophyseal trouble, but the reaction round the Ammon's horn, which by the German histopathologists is considered as the seat of pathology in epilepsy. Reaction with dentate nucleus. Thirty-eight dialyzers.

In all 9 cases with 352 single tests.

Since the beginning of April 1,291 single tests were made.

On the following days the Wassermann and Lange reactions for the County Court were performed:

October 3, 1917 .....	28	Wassermanns	4	Langes
October 9, 1917 .....	20	Wassermanus	3	Langes
October 17, 1917.....	22	Wassermannus	9	Langes
October 23, 1917.....	25	Wassermanus	10	Langes
October 31, 1917 .....	33	Wassermanus	12	Langes

In all..... 128 Wassermanns      38 Langes

Twice the colloidal gold solution was prepared.

Stools: Only one stool, that is the one of Chas. Messer, was under work for isolation of proteose, and again a large quantity was found.

The Ca—Estimations were finished on 6 cases and the contents found very high.

JULIUS RETINGER, Ph. D.

(Report to be Continued.)

We make no attempt to disturb the system of philosophy that now prevails, or any other which may or will exist, either more correct or more complete. For we deny not that the received system of philosophy, and others of a similar nature, encourage discussion, embellish harangues, are employed, and are of service in the duties of the professor, and the affairs of civil life. Nay, we openly express and declare that the philosophy we offer will not be very useful in such respects. It is not obvious, nor to be understood in a cursory view, nor does it flatter the mind in its preconceived notions, nor will it descend to the level of the generality of mankind unless by its advantages and effects.

N. O.

To be selfish with the results of one's scientific labors is as much to be reprobated as to be selfish with time or money or counsel, and even more so. To act grudgingly with one's facts or discoveries, to hoard and withhold, to stand primarily for "credit" is not the scientific spirit.

L. H. BAILEY.

# Dementia Praecox Studies

VOL. I.

JULY 1, 1918

No. 3

## DEMENTIA PRAECOX AS A SOCIAL PROBLEM IN NEW YORK STATE

BY HORATIO M. POLLOCK, Ph. D.,  
Statistician, State Hospital Commission

I wish to speak this evening of some of the broader aspects of dementia praecox and to point out some of the practical bearings of the facts that have recently been accumulated concerning this form of mental disorder. It has long been known that dementia praecox patients constitute a large part of the chronic cases in State hospitals for the insane, but it was something of a shock to learn when the first census of the psychoses of the patients resident in our civil State hospitals was taken on July 1, 1916, that of the total patient population of 35,213, 18,940, or 53.81 per cent, were cases of dementia praecox! The census taken a year later showed that these cases had increased to 19,544; the percentage, however, had remained practically the same. The number of dementia praecox first admissions to the civil hospitals during the fiscal year ending June 30, 1917, was 1,475, or 21.4 per cent of the total first admissions, and the number of deaths in the group was 852. Excluding transfers, there were 674 discharges and 469 readmissions in this group. The total number of dementia praecox cases under treatment during the year was 21,070.

These data give a glimpse of the magnitude of the problem but they do not tell the whole story. Kirby and Bleuler have called attention to the fact that certain dementia praecox cases develop without hallucinations or pronounced trends of any sort, and on account of the absence of psychotic symptoms, rarely reach the State hospitals, but become chronic loafers, beggars, tramps and poorhouse inmates. The number of these useless human forms is not known but the burdens they impose on society are exceedingly heavy.

The significance of the 19,544 institution cases of dementia praecox may be better seen by comparison with other wards of the State. On June 30, 1917, the number of prisoners resident in the five State prisons was 4,509; the number of feeble-minded in State institutions was 3,461; the number of epileptics, not feeble-minded nor insane, cared for by the State was 1,466, and the number of all classes of inmates in other State charitable institutions was 4,572. The combined population of the five State prisons and the eighteen State charitable institutions on that date was

14,008—or 5,536 less than the number of dementia praecox cases in the civil State hospitals. If the dementia praecox patients now in our State hospitals were removed, nine of the thirteen hospitals could be closed and the remaining four would have 752 less patients than at present. The net increase of dementia praecox patients in our civil State hospitals last year was 614. If this rate of increase continues, as it probably will, a new institution of the size of the Middletown or Buffalo State Hospital will have to be built every three years to provide for this *one* class of patients alone.

In our recent statistical studies of the various psychoses we have obtained a general view of dementia praecox patients so that we can now state some fairly positive facts concerning the group as a whole. With respect to age, we find that of every 100 dementia praecox first admissions, 8 enter the hospital before reaching the age of 20 years; 43 enter between the ages of 20 and 30 years, and 30 between the ages of 30 and 40 years; the remaining 19 are 40 years of age or over at the time of admission. Marked differences appear between the ages of the male and of the female first admissions. Sixty per cent of the male cases and only 41 per cent of the female cases are under 30 years of age at the time of admission. Eighty-nine per cent of the males and 71 per cent of the females are under 40 years of age. The percentages of cases between the ages of 30 and 40 years are practically the same in both sexes. The fact that 49 per cent of the cases are 30 years of age or over at the time of admission shows that dementia praecox can not be considered as *insanity of youth*, as the term implies.

The percentage of dementia praecox first admissions with unfavorable family history varies from year to year, but our statistical reports indicate that approximately 50 per cent of the ascertained cases have a family history of insanity, nervous diseases, alcoholism or neuropathic or psychopathic traits. On the other hand, approximately 50 per cent of ascertained cases have no unfavorable family history.

With respect to original mental makeup, we find that 46 per cent of the ascertained cases are temperamentally normal; 54 per cent, temperamentally abnormal; 78 per cent, intellectually normal; and 22 per cent, intellectually abnormal. The temperamental peculiarities in some cases may be the beginning of the disorder rather than an inherited defect.

Alcohol is an assigned etiological factor in approximately 4 per cent of the cases, and the intemperate use of liquor is reported in an additional 8 per cent. These percentages vary somewhat from year to year.

With respect to marital condition at the time of admission, we find that 65 per cent are single; 27 per cent married; 4 per cent widowed, and 4 per cent divorced or separated. The males differ markedly from the females with respect to marital condition. Of the males alone, 79 per cent are single and 16 per cent married; while of the females 50 per cent are single and 38 per cent married. The percentage of single patients among first admissions of all groups is 46, and of married, 39. The failure of

such a large proportion of these patients to marry would seem to indicate that dementia praecox is not, like feeble-mindedness, a self-propagating defect condition.

With regard to school training, we find that 67 per cent of the dementia praecox first admissions are reported as having a common school education; 7 per cent as having a high school education, and 1.3 per cent as having a collegiate education. These percentages vary but slightly from those obtained for the first admissions of all groups.

With respect to economic condition, we learn that 17 per cent of the dementia praecox first admissions are dependent; 83 per cent are self-supporting, 75 per cent being in marginal circumstances, and 8 per cent in comfortable circumstances. The percentages of dependent, marginal and comfortable for all first admissions are 17, 71 and 12 respectively.

The dementia praecox cases come principally from cities. In 1917 the percentage of urban first admissions was 92.5 and of rural, 7.5; while the per cent distribution of the general population of the State in 1910 was 78.8 and 21.2 respectively. The rate of dementia praecox first admissions per 100,000 of the general population in 1917 was 17.3 in cities and 5.2 in rural districts.

With respect to occupation we find that dementia praecox patients come from all branches of industry but the rate of incidence of the disorder varies greatly in different occupations. It is higher in indoor than in outdoor occupations; and in domestic and personal service than in other indoor occupations. The highest rate of incidence is found among servants and laborers. Many cases come, however, from manufacturing and mechanical industries, and from clerical and professional service. Of the 3,483 male dementia praecox first admissions admitted to the civil State hospitals from October 1, 1909, to June 30, 1916, 96 came from the ranks of the professions; 18 were musicians; 16, draftsmen; 10, teachers; 7, artists; 6, lawyers; 4, dentists; and 3, physicians. There were no statisticians among them.

It is well known that the hospital treatment of dementia praecox patients results in complete cure in but very few cases. Of the 21,070 cases under treatment in the civil State hospitals during the fiscal year of 1917, 21 were discharged as recovered; 247 as much improved; 272 as improved; and 134 as unimproved. It is probable that most of the cases discharged will return to the hospitals. The total number discharged benefitted by treatment equals approximately 28 per cent of the total dementia praecox admissions of the year. In the other groups of psychoses the percentage was 41.5. Eight hundred and fifty-two dementia praecox patients died in the hospital. The average age at death was 50 years. The death rate per 1,000 under treatment was 40.4. The average time spent in hospitals for the insane by the dementia praecox patients who died was 16 years. This period is considerably longer than that spent by the average patient in any other clinical group. The general average period spent in hospitals by

patients of all groups who died in the hospitals in 1917 was 6.3 years. The general average period of all patients other than dementia praecox was 3.5 years.

In treating dementia praecox patients in the hospital it is found that about half of the younger cases can be taught to do useful work and some become fairly efficient hospital workers. Besides instruction in industrial work, some physical training is given and a few accessible cases are helped by psychoanalysis. As the disorder is generally regarded as incurable the aim of treatment is to make the patient as useful and comfortable as possible and to prevent further deterioration.

Here then is our problem in this State. We have 20,000 apparently hopeless dementia praecox patients to be cared for at public expense, for an average period of 16 years; 1,500 new cases coming into the civil State hospitals each year, causing a net annual increase of 600. We do not know the fundamental causes of the disorder and we do not know how to cure or prevent it. What is to be done? I ask this question here because the State is looking to us for an answer. Shall we be content to let the accumulation of these cases go on indefinitely? Shall we assume a pessimistic attitude and say nothing can be done? Shall we wait until the problem is solved by someone else? Or, shall we take up the problem and solve it ourselves? We have competent investigators, psychiatrists, pathologists, social workers and statisticians who might jointly study this problem under the guidance of the Director of the Institute. If more funds are needed, I am sure the State will supply them. A hundred thousand dollars a year might well be spent in learning how to prevent and cure a malady that now involves direct and indirect losses to the State of more than \$10,000,000 a year.

If some unknown physical disease should strike down and kill 1,000 young people in this city during the current year, do you think the medical profession, the newspapers and the public generally would view the matter with complacency? Yet dementia praecox will come into this city as a masked enemy and steal away the minds of 1,000 young men and young women and condemn them to a living death during this year 1918, and scarcely a public mention of the matter will be made.

Disease prevention is a comparatively new field of scientific endeavor, but within the past 30 years many virulent diseases have been conquered and the average span of human life has been greatly lengthened. Until recent years attempts to combat mental disease have been unavailing, but now great progress is being made in the elimination of the causes of alcoholism and of general paralysis. Our victories in these fields should give us courage to undertake the much more difficult drive against our most insidious enemy, dementia praecox.

## DIET AS A FACTOR IN THE CAUSATION OF MENTAL DISEASE\*

BY CHARLES MERCIER, M. D.

"Forty years long was I grieved with this generation and said: it is a people that do err in their hearts, for they have not known my ways."

It is just forty years since I first ventured to call in question the accepted doctrines of the causation of nervous diseases. In an article in the *British and Foreign Medical and Chirurgical Review*, an excellent quarterly now long defunct, I likened the imagination of physicians in this respect to the imagination of that fortunate sailor to whom was granted (nowadays we should say who was given) the fairy privilege of having three wishes fulfilled. After he had secured all the rum in the world and all the tobacco in the world by his first two wishes, he could think of nothing further to desire than "a little more rum." So physicians, after they had attributed every known nervous disease to sexual excess and syphilis, had no explanation of a new disease to offer beyond a little more sexual excess. The only nervous diseases that were not then attributed partly or wholly to syphilis were tabes and general paralysis. Some five-and-twenty years ago, when an eminent physician was about to lecture upon the causes of insanity, I hazarded the conjecture that we should hear a good deal about masturbation, and I had no reason to repent of my prophecy. We may be pardoned a little natural exultation when we contrast the present state of etiological doctrine with that which prevailed in those dark ages. We had then no more reason for our belief than Aristotle had for the belief that all heavy bodies tend to the centre of the universe, but now we know that the mental diseases that we used fondly to ascribe to sexual excess and syphilis are, in fact, due to repressed complexes and infantile incestuous longings. How foolish were our predecessors! How enlightened are we!

Without impugning in the least the startling discoveries that we owe to the cleanly minded imagination of Freud, I think it possible that they may be supplemented by researches less recondite. When I study his efforts to discover the causes of mental disease, I am irresistibly reminded of the story of The Purloined Letter. The detectives knew that it must be in the room, so they groped up the chimney, pulled up the floor, sounded the walls, probed the furniture, and ripped up the cushions, without finding the letter, which was lying displayed prominently under their noses all the time. It has occurred to me that our difficulty in discovering the causes of mental disease may possibly be of the same kind. We may perhaps be looking in the wrong places, and instead of searching for them in the privy and groping in the night-stool, on the system of Freud, we may possibly find them on the dinner-table, and in the sugar-basin and the butter-dish. At any rate, we can pursue this method of investigation with-

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out defiling our minds; and even if we are unsuccessful, we can leave off with clean hands.

To this line of investigation I was directed by several considerations. First, it is beyond question that certain things, when taken into the stomach, are capable of producing mental disease. Alcohol is an example. Second, the defect of certain constituents of the blood does produce mental disease. Cretinism and myxedema are examples. Third, whatever the immediate source of these constituents, their ultimate source is in the food. If the ingredients of the products of the ductless glands are not in the blood, those products will not be produced; and if the ingredients are not in the food they must be absent from the blood also. Moreover, fourth, it may be that there are certain ingredients in the blood, and therefore in the food, that are necessary to mental health, even without elaboration and transformation in the ductless glands; for investigation has now discovered the existence and the astonishing properties of vitamines. Whatever the nature and whatever the mode of action of these puzzling substances, it is beyond question that their absence from the food does profoundly affect not only the physical health, but the mental health also. Hence I conjectured that it was possible investigation might discover, in the antecedents of some cases of mental disease, some error in the diet that might have a causal connection with the disease.

At this point a great difficulty presented itself. Granted that one or more errors or peculiarities in diet were found among the antecedents of mental disease, how could it be possible to assure oneself that such errors or peculiarities were actual causes, and not mere casual associates or antecedents of the disease? To ascertain this I naturally turned to the writings of logicians, all of whom, and they are many, discuss this matter in their chapters on Induction; but alas! I found that upon this topic the logicians are as inept and as manifestly erroneous as they are on every other topic that they discuss. Not one of them affords any trustworthy criterion or test by which a cause may be distinguished from a mere antecedent or associate, and on this matter their writings are as confused and self contradictory as they are on every other. It became necessary, therefore, to examine afresh the whole subject, not only of the nature of causation, but also of the methods by which causation can be ascertained; and the results of this examination are embodied in the articles which have already been published in the *Journal of Mental Science*. From this I may extract for the present purpose the following principles, which are all that have a direct bearing on the subject now under discussion:

First, that a cause is, strictly speaking, an action, more loosely speaking, an agent exerting an action, on the thing in which the change that we call the effect is produced. That thing in the present case is the patient.

Second, that before we can call an action upon a thing the cause of any subsequent change in that thing, we must prove a connection between the action and the change.

Third, that this connection may be proved in at least a dozen different ways, the only ways applicable to the case under consideration being those included in the Method of Association. When an action upon a thing is associated with a subsequent change in that thing we must not infer that the action is the cause of the change unless—

(a) We can isolate the action—that is to say, unless we can be sure that it is the only action upon the thing at the time that could have produced the change; or

(b) The association is constant—that is to say, the effect always follows the action, and is never present unless the action has taken place; or

(c) Though neither isolable nor constant, the action is associated with the effect more often than casual concurrence will account for; or

(d) Though the association is neither isolable nor constant, yet when the effect is associated with the action, there is a constant peculiarity in the effect.

By applying these principles we can ascertain whether a disease that is associated with what we may conjecture to be a cause, is or is not due to that cause. Such testing of conjectural causes has never yet been performed, except in the case of infectious diseases. With the discovery of parasitic micro-organisms the causes of a large class of diseases have been ascertained, but our speculations as to the causes of non-microbic diseases are much the same as they were forty years ago. With respect to these diseases the custom is to hazard a conjecture, and to speak of the conjectural cause as if it were an ascertained cause; and with respect to mental disease our attribution of cause is chiefly determined by fashion. At one time, as I have said, the only causes attributed were sexual excess and syphilis. These were followed by heredity; heredity was followed by toxins; toxins were followed by repressed complexes. In vain have I called on their supporters for evidence of the truth of these doctrines. Truth, as Dr. Johnson said, is a cow that will yield them no milk, so they have gone to milk the bull. The utmost and the only result of my endeavors has been that the Medico-Psychological Association has altered the title of its Table of Causes, and now calls it a Table of Etiological Factors. I do not think the change was made merely for the sake of euphony. It was made, I believe, with the intention of eluding my criticisms. Alienists have the most profound and complete conviction that they can alter the nature of things by altering their names and that when a new name is given to a thing a new thing has been discovered. Thus, when that which has been known for many years as primary dementia is called dementia praecox, they are lost in admiration of the brilliancy of the new discovery, and can scarcely find terms strong enough to express their admiration of the discoverer. They seek to abolish the terrors of madness by calling it lunacy; they seek to abolish the terrors of lunacy by calling it insanity; they seek to abolish the terrors of insanity by calling it unsoundness of mind, which it isn't, or mental breakdown,

or neurasthenia. I look forward hopefully to the time when they will call it Mesopotamia. They seek to abolish the terrors of mad-houses by calling them asylums; they seek to abolish the terrors of asylums by calling them retreats; they seek to abolish the terrors of retreats by calling them sanatoria or mental hospitals. The last title carries a subtle suggestion of self-complacency, for how great must be that mind which can contain an entire hospital! I suggest, with some diffidence, that it would be still more impressive to call the hospital after a part or faculty only of the mind. We might call it, for instance, an imaginary hospital. Following the same easy and efficacious method, alienists propose, when I show that what they call causes are not causes, to nullify my criticisms by altering the name and calling them etiological factors. One of my ways is to call a spade a spade, but alienists prefer to call it an agricultural implement. It is indeed a people that do err in their hearts, for they have not known my ways.

So far I can follow Moses, but when he loses his temper and proceeds to swear at his recalcitrant people, I must renounce his leadership. Falstaff declared that he was as poor as Job, but not so patient. I, on the other hand, may justly claim to be more patient than Job, though perhaps not quite so poor. His period of affliction was but brief. His friends sat by him in silence for a week, and the whole of the subsequent discussion on Moral Conduct as a cause—I beg pardon, an Etiological Factor—in Good Fortune could scarcely have lasted for more than another week, after which his trial came to an end; but I have suffered my fellow alienists, as gladly as I possibly could, for forty years, and for the whole of that time they have erred in their hearts and have not known my ways.

Moreover, though Job was less irritable than Moses, and did not go as far as actually to swear in his wrath at those who were so wrong-headed as to take the other side in the discussion, and to refuse to adopt his views, yet it must be confessed that his patience and forbearance have been a good deal exaggerated, and fell far short of the meekness of Patient Grizzel or the Nut Brown Maid. More than once he was within an ace of losing his temper. "No doubt," said he, "but ye are the people, and wisdom will die with you. But I have understanding as well as yon," and so on. No one can accuse me of such petulance, even towards psycho-analysts. If they were to bring forward an argument, or even anything that colorably resembled an argument, in favor of their crazy system, I should examine it, I trust, with patience, and with what gravity I could muster; but though it is my way, it is not their way to give a reason for the faith that is in them. It is a people that do err in their hearts, for they have not known my ways.

The following cases have occurred in my practice in a period of about three years:

Case 1.—Footman, æt. 27. Suffered for years from severe headaches, and for the last four weeks from that form of sleeplessness which consists of inability to get to sleep. For a few days suffered from attacks of dizziness, and one very hot afternoon, in one of these attacks, he acted

so strangely that he was taken to Bethlehem, where he talked a great deal about the country being infested with foreign spies. (This was before the war.) He eats but little meat, is very fond of fat—fat meat of any sort, butter, and dripping, which he spreads thick. Has four cups of tea per diem, with three lumps of sugar in each, or nearly a quarter of a pound in all. He was told to knock off his fat, butter, dripping, and sugar, and to eat more meat. During the next week he had one bad attack of headache and dizziness, and two slight headaches. During the second week two slight dizzy attacks, but no headache. In each of the next weeks he had one bad headache, and after this they finally ceased. He was now sleeping well, and completely recovered.

Case 2.—Woman, at. 53. She feels muddled and dazed, and the feeling is so severe that it keeps her awake at night. With this there is pain in the head, which also is severe. These symptoms have been gradually increasing for three years, and are now bad enough to prevent her from working. She does not care for meat. Eats it only at one meal a day, and not more than five days a week. She is fond of fat, but says she does not eat a great deal. Does not eat much butter or sweets. She is told to regulate her diet, and soon ceases to attend. Presumably her symptoms are relieved.

Case 3.—Clerk, at. 26. A wave of confusion comes over him, he falls down, but does not lose consciousness or hurt himself. For many years he has suffered from severe headaches, coming on once a month, so severe that they compel him to lie down. He goes to sleep and awakes prostrate. Even if they come on in the street he feels inclined to lie down then and there. His sight is not affected. He does not care for meat, lives chiefly on milk puddings. He is very fond of fat, and when he does have meat he eats the fat and leaves the lean. Takes very little exercise. Has had the headaches for fourteen years, and they have been gradually getting worse. He is told to stop the milk puddings, to reject fat, and to eat lean meat at least twice a day. At the end of a week he reported himself greatly improved, and then ceased to attend.

Case 4.—Telephone operator, at. 30. Very nervous. A sudden noise or being suddenly spoken to makes her start violently. She is losing her business memory—that is to say, she forgets what she has to do. She is so nervous that she screams when a dog comes near her, and cries when she enters a church. She suffers much from throbbing pains at the back of her head. She works in an underground room by electric light from 9 to 6. Her breakfast consists of bread and butter and tea. Lunch, tea and a bun. The same for tea. For supper she has three or four days a week a chop or eggs and bacon; on the other three or four days bread and butter. She is told to adopt a different diet and eat more meat, but as her wages are only 14s. per week she says this will be difficult. She ceased to attend, and the progress of the case is unknown.

Case 5.—Married woman. She has been depressed for several years.

The depression is now so severe that she contemplates suicide. Sleeps very badly, and has awful dreams. Cries for hours every day, and can take no interest in her work nor in her child. She eats little of anything; lives chiefly on bread and butter; does not care for fat, but is very fond of butter, and eats a great deal of it. Drinks much tea, and likes it sweet. Told to leave off sugar, to reduce her bread and butter to bread and scrape, and to eat meat. For the first week she did not improve, but it appeared she had not modified her diet except in leaving off sugar. The necessity of complying with instructions was impressed upon her, and the following week she admitted, with evident surprise and reluctance, that she was better. She had not cried once, and now had hopes of recovery. Hitherto she had been certain that she would either die or go mad. From this time she improved so much that she slept soundly every night, became quite cheerful, and spoke with enthusiasm of the treatment, saying it had worked a miracle. She was told she need not attend any more, but three weeks afterward she appeared again, having suffered a relapse. She said she was as bad as ever, but this was evidently an exaggeration. She was, however, depressed, and upon inquiry it appeared that she had become pregnant. During her pregnancy she continued depressed, but with wide fluctuations. She dreaded her confinement, having had a very bad time with her previous child. However, it passed off fairly well, but she attended again with her month-old baby, with all her old symptoms as bad as ever. She was told to wean the child, and on the next visit she had improved, though the child was only partly weaned. She was urged to wean it entirely, which she did, and this time she rapidly improved, and in two or three weeks was completely well.

Case 6.—Married woman, æt. 26. She is very depressed at times, but her chief trouble is that she is so muddled about her work. She has always been such a good manager, but now, though she knows what she ought to do, she cannot do it. She has to be told what to do even in the simplest domestic duties, such as getting the baby's bottle ready. She is depressed by the sense of her own unworthiness, and imagines that her home, her husband, and her children are dirty, and that it is her fault. She has two children, and her husband, who, when in work, earns about \$4., has been out of work for six months. She has been managing her mother's house as well as her own, and has half-starved herself in order that the children might have enough. The almoner's servicees were requisitioned, work was found for the husband, the patient was enjoined, and assisted to get proper food in proper amounts, and in a month had lost all her symptoms.

Case 7.—Salesman, æt. 27. For seven years he has had a gradually increasing confusion of mind. When he hears people talking he does not understand what they say; it is as if they were speaking in a foreign language. When told to do anything he stands and looks stupid, until after a time it dawns upon him what is meant, and he does correctly what he

is told. He is sometimes told that he does not know what he is talking about, and he says it is quite true that on these occasions he does not know. On one occasion on his way home he asked twenty or thirty people to direct him, though he knew the way quite well. He has only two meals a day, and meat at only one of these, and then not much. He had six cups of tea per diem with two lumps of sugar in each—nearly a quarter of a pound in the day. He was told to leave off his sugar and eat meat twice a day and more of it. At the next visit he was much better, and then ceased to attend.

Case 8.—Married woman, æt. 25. She says: "I have a funny feeling in my head, I feel half dazed, and don't know what I am doing. I feel I can't settle myself; I am so restless, I can't keep still. I feel as if I want to get about and do my work, but I am half silly, and can't do what I want to. I go off into screaming fits as soon as I am left alone; I don't know why, I am not afraid of anything. And I am so depressed. I suffer much from shooting pains through my head." She has meat always once a day, and sometimes twice, but not much. Has six cups of tea, with two lumps of sugar in each, and is very fond of butter. Eats the best part of half-a-pound per day. She is told to knock off almost all her butter, and to eat bread and serape, and to increase her ration of meat. In a fortnight she was much better. Her head, she said, was not quite as it should be; every other day she feels all right, but on alternate days she is much troubled. In another fortnight she was practically well, and thereafter ceased to attend.

Case 9.—Dressmaker, æt. 28. For three years she has become more and more depressed and nervous and during the last six months she has been very bad. She is subject to attacks of pain in the head which used to last a few hours and went off if she lay down and kept quiet; but now they last two or three days and nights, and sometimes for a week. They are brought on especially by railway journeys, even if brief. She is alone all day from 6:30 in the morning until 8 at night. Does not like sweets, but is fond of fat and eats a great deal of butter, fat meat, and fat bacon. No instruction as to diet was given to her on her first visit, and for the next fortnight she did not improve. Then she was told to reduce her bread and butter to bread and serape, to renounce fat in all forms, and to eat more of the lean meat. In the following fortnight she had but one attack, but this was very severe. The journey by rail from Surrey gave her no discomfort. In the next week she had no attack until she took the journey to see me, which brought on a very slight one. In the following fortnight she had several attacks, one of which lasted all day and part of the night; the other three were slight. In the next fortnight she had but one attack, which, however, lasted all day, and a slight one brought on by the railway journey. In the next fortnight she had no attack, and then ceased to attend.

Case 10.—Married woman, æt. 33. For three months she has suf-

ferred from "nervous debility," by which she means that she is low spirited, weeps for no reason, trembles, and imagines that something awful is going to happen. She is worst in the morning, improves as the day goes on, and is all right by tea time. She is much alone, her husband being a clerk and absent all day, and she has no children. No note was made of her diet, but it must have been found faulty, for she received instructions to alter it. At the end of a week she was no better, but on inquiry it was found that she had not followed the prescribed diet. She was told to observe it strictly, and at the end of a week she reported that she had no depression to speak of. At the end of another week she reported herself well.

Case 11.—Married woman, at. 55. A feeling rises from her feet to her head, where it becomes a tightness, and she feels sometimes as if she had had a blow on her head, sometimes as if her brains were being drawn out. The strange feeling in her head often wakes her in the night. She lives chiefly on bread and butter, but does not take very much butter; does not care for fat or sweets. Eats very little meat, never more than two ounces per diem, and some days none. She was told to eat meat twice at least every day, and in larger quantity. She did not attend again, but three months afterwards I heard from her that she became so rapidly better that she did not think it worth while to attend any more.

Case 12.—Laborer, at. 45. For twenty years he has suffered at increasing frequency intervals from severe pains in the head, coming through to the eyes. It comes on in the morning and lasts all day. Sleep is the only thing that relieves it. He looks much distressed, and says it drives him distracted, and he loses many days' work through it. Cannot eat fat, does not like it, but is very fond of butter. Lives chiefly on bread and butter and eake. Drinks about three pints of tea per diem, in which he takes, I find by calculation, from  $2\frac{1}{2}$  to 3 pounds of sugar per week. He was told to knock off his butter and sugar and to eat more meat. He returned in a fortnight in high spirits, extolling the treatment enthusiastically, and reporting that he had had no headache at all for ten days, a longer interval than he had known for many years. After this he ceased to attend and may be presumed to have recovered.

Case 13.—Married woman, at. 28. Three weeks ago she had some "silly fancies." Turned against her husband and accused him of trying to poison her. Had a friend to visit her, and when the friend was gone the patient had a horrid fear that she was not gone. The patient had quarreled with this friend and called her a liar. She now says that her husband is one of the best fellows going, and so is the friend she turned against. She has no such silly fancies now, but her memory is bad and her mind is confused. When she puts a thing down she cannot remember what she has done with it. She does not always know where she is, and sometimes gets out of a tram when the journey is only half complete. She is alone all day, her husband leaving home at 7 a. m. and not returning until 6:30 or 7 p. m. She has meat always twice a week, but not

always three times. Lives chiefly on bread and butter. She was told to regulate her diet, but I do not know whether she did so. She attended for a month, during which time she did not improve, and she then ceased to attend.

Case 14.—Married woman, aet. 44. She suffers much from pain in the head, which keeps her awake at night, so that some nights she does not sleep at all. In addition to this she hears voices and sees visions. She constantly hears people talking, all day and all night. The voices are quite distinct, sometimes loud, sometimes a whisper; some of them are the voices of people she knows, others are strange to her. They repeat everything she says and threaten her. Once she was told that her husband was at Paddington Station waiting for her, and she took a cab and went to meet him. The voices abuse her, and their language is cruel, dreadful. Besides this, she sees faces at the window and at the door. Once a woman met her on the stairs, addressed her by name, and asked her about a ring she was wearing. The woman then went into a closet on the stairs. The patient followed her into the closet, but found it empty. The same night when she went into her own room she found three men there. One was a chef whom she knew, the others she did not know. One of these demanded money of her; and the chef said he was doing a dinner at Covent Garden and asked her to help him. She was about to give money to the man who asked for it, but when he stretched out his hand there was nothing to drop the money into. She could see the carpet through his hand. Up to that moment she had thought the men were real, but then she knew they were not. She put down the money and fled. She first began to see visions and hear voices eighteen months ago. They are so real that she cannot help thinking they are real people talking to her, though she tries to think they are only fancy. She is not fond of meat, goes without it three days a week, and on the other days eats very little, and then only the fat. She is very fond of fat and butter. Lives chiefly on bread and butter, the butter spread thick, and puddings. She used to like meat, but left it off two years ago. She was advised to alter her diet, to eschew butter and fat and eat meat. She did not attend again.

Case 15.—Married woman, aet. 50. Has suffered as long as she can remember from incapacitating headaches. Wakes with them in the morning, and they go off toward night. She eats meat every day, but "ever so little," not more than two ounces. Cannot eat sweets, but is very fond of butter, spreads it thick upon her bread, and lives chiefly on bread and butter. Advised to alter her diet. Did not attend again.

Case 16.—Mechanic, aet. 27. "My mind," he says, "is always concentrated on myself. I suffer from pressure at the back of my head. I am always wondering what is going to happen—whether I am going to fall down or faint away. I cannot sleep; never go to sleep until 2, and wake at 4 or 5." He never eats meat more than four days a week, and for the last two months only in the form of a ham sandwich, which constitutes

his dinner. Eats but little fat, and not much butter, but is fond of dripping. Was told to modify his diet, but the progress of the case is unknown.

Case 17.—Married woman, aet. 53. Constant pain in head, which keeps her awake at night. Her mind wanders, and she pictures horrible things, such as people drowning. She sees these things when between sleeping and waking. Forgets what she has to do. Eats meat not more than three times a week, and then very little. Is fond of butter, spreads it thick, and eats a good deal, for she lives chiefly on bread and butter. Told to eat meat daily and reduce the bread and butter to bread and serape. She did not carry out these instructions very faithfully, but slowly improved until in three months she ceased to see the pictures, slept better, and lost the pain in the head. After this she relapsed, the pain returned, and she saw people in her room at night. I then set the almoner at her to see that my instructions were carried out, and again she improved, this time rapidly and much. Subsequently, on the supervision being taken off, she again relapsed.

Case 18.—Married woman, aet. 36. For eighteen months she had had attacks about the time of her periods of laughing and crying, with a feeling of suffocation. She forgets that she has done a thing, and does it over again repeatedly. She suffers much from headache at a spot on the right side of the forehead. Husband has been out of work for eighteen months. She has had no meat for a long time. Never buys any. For the last eighteen months has lived on oatmeal and rice. She ceased to attend, and further progress is unknown.

Case 19.—Widow, aet. 70. Pain in the head, giddiness, sleeplessness, shocking dreams. Between sleeping and waking has visions of murdering people. Lives chiefly on milk puddings and a little fish. Meat once a week, fish twice, and but very little of either. Does not go to sleep till between 3 and 4, and sleeps only for two or three hours. Told to eat meat every day, and a larger ration. In a week she had increased her sleep to four or five hours. In a fortnight she lost the visions. In three weeks she was sleeping well and did not dream. In four weeks she was sleeping ten to twelve hours, but still suffered from pain in the head. In seven weeks she lost her headache, slept well, and did not dream. Volunteered that she was better than she had been for three years.

Case 20.—Married woman, aet. 42. Headache and throbbing of the head. Very nervous. Imagines things—that someone is fumbling with the handle of the door, and trying to get in; that her husband is unfaithful. Has no strength, and can take no interest in things. Bursts out crying without reason, and is depressed. Cannot give her mind to anything. Everything seems too much for her. It is becoming too much trouble to wash her child. She has meat once a week only—on Sundays. Told to eat meat daily. At the end of a month her depression had nearly gone, and she had no difficulty in attending to the child. Went for days without crying. She continued to improve, and in two months ceased to attend.

Case 21.—Servant, at. 56. Pain and pressure on top of the head. Sleeps badly. Depressed. Cries a great deal, and thinks everyone is against her. Eats fat and butter, but not in excess. Is fond of sweets, and eats much cheese. Told to eschew cheese and sweets and eat more meat. She improved slowly and irregularly. In six weeks she was able to sleep "quite well." Her spirits improved a great deal; she lost her headache, but she was not well when, at the end of four months, she ceased to attend.

Case 22.—Married woman, at. 24. Her nerves are bad. She cannot bear to be alone. Feels that if left alone she would commit suicide. So depressed that she always wants to sit down and cry. Terribly irritable. Has fits of panic with trembling. Lives chiefly on bread and butter and milk puddings. Eats a little meat every day, but very little, as she is not fond of it. In a fortnight she reported herself a little better. She had been eating more meat, but still not much. She was told that she must eat more, and at the end of a fortnight she reported herself very much better. In six weeks she could sit alone in a room if she knew there was someone else in the house. Had ceased to cry and had no trembling fits. In another fortnight she was practically well and ceased to attend.

Case 23.—Unmarried woman, at. 22. Three years ago she was left by the death of her mother in charge of the house and of two younger sisters. For twelve months she has been out of health. Wanted to shut herself up and be away from everyone. During the last few weeks she has become worse. She imagines things, sees ghosts—her mother and brother, both of whom are dead. Last week she cried a great deal, and the week before she kept laughing without provocation. One day she lay on the floor all day. She sleeps very little. No headache. For many weeks past her appetite has been very bad. For a fortnight she has eaten scarcely anything, and for the last three days nothing at all. Her sister was told to urge and compel her to eat plenty, especially of meat, and carried out the instruction. In three weeks she was sufficiently improved to be sent to a convalescent home in the country, with instructions as to diet, for three months. She returned quite well. Said she feels all right, never cries or laughs irrationally, never sees ghosts; eats and sleeps well.

Case 24.—Male. Pain in the head. Depression. Feels as if he were going out of his mind and as if he must do away with himself. Sleepless. No reason for the depression, and he cannot understand why he should feel it. Eats no breakfast, but has two raw eggs in milk. Not fond of fat, but very fond of butter and eats a great deal of it. Two eggs in milk for tea. Told to revise his diet, omit the butter and the yolks of eggs, and to eat meat. In a week the pain in the head was lessened, but the depression and other symptoms continued. In another three weeks the headache was still further improved and he felt "much brighter." He then ceased to attend.

Case 25.—Housemaid, aet. 28. She has "dreadful thoughts." Her mind is confused. She "feels desperate." Cries a good deal and mopes, Cannot sleep. Cannot bear to be left alone, but people being with her irritates her. This has been gradually coming on for a year. She has not touched meat for eighteen months. Has no breakfast and lives chiefly on bread and butter and milk puddings. She never has headache. She was told to revise her diet and eat meat, but she was not efficiently supervised, and it is doubtful whether she carried out the instructions faithfully. At the end of a month she reported herself as "certainly improved," and then ceased to attend.

Case 26.—Widow, aet. 77, says, "My head is in a muddle. I sit down to write a letter and I know what I want to write, but I can't write it. I often find I have written it wrong. All of a sudden things go blank and I leave words out. I am of a very worrying disposition and am always depressed." She suffers much from headache, and has to spend one day in every week in bed on account of it. For two years she has eaten no butcher's meat, but occasionally she eats an egg, or a little fish or chicken. Lives chiefly on milk puddings. Took to a vegetarian diet on account of indigestion. Does not eat much fat or butter, but drinks large quantities of milk. Seen once only.

Case 27.—Married woman, aet. 32. "I am tired of everything and everything is a worry. I can't think. I have such pain in my head it makes me forget everything. I sleep badly, and all night my mind is on the work. There is something in my head that causes everything to be jumbled up." She eats large quantities of raw rice and starch. She eats more than a teaspoonful of rice every day (a tablespoonful of rice will make a pudding large enough for four people.) She does so because it is company for her and stops her from thinking. She goes without her meals and eats rice instead. Seen once only.

Case 28.—Farmer, aet. 34. Lacks confidence in himself. Cannot concentrate his mind upon his work. Incapable of mental exertion. Little things worry him excessively and unreasonably. Sleeps well, but dreams much. No headache. Bad family history. Has been a vegetarian for three years, living chiefly on grape-nuts, bread and butter, rice, macaroni, sago, and tapioca. Cannot eat fat and is very moderate with butter. Told to rearrange his diet and eat meat two or three times a day. In a month he returned much improved. He had an assured and confident demeanor; said he had a better grip on his work and had no difficulty in concentrating his mind.

Case 29.—Married woman, aet. 35. Has horrid thoughts and feels as if she were going out of her mind. Silly things come into her mind. The knives on the table suggest to her to do horrible things—harm herself or someone else. She thinks she has done things that she knows she has not done—things like injuring people. She has frequent headaches, with "golden zigzags." Never eats breakfast. Dislikes meat, often goes with-

out, and when she takes any it is very little. Does not like fat, but is fond of butter and spreads it thick. Seen once only.

Case 30.—Married woman, at. 48. "I can't think. Everything seems altered. I can't remember what things look like. I have two children, and I can't remember what they are like. Oh, yes; I know them when I see them. Everything seems getting more and more strange." Husband says she complains much of headache and sometimes of giddiness. Eats very little meat and a great deal of butter. Lives chiefly on milky puddings and bread and butter. Seen once only.

Case 31.—Married woman, at. 37. Has a muddled feeling in her head and is apprehensive that something dreadful is going to happen, and such awful depression. Becomes frightfully tired after trifling exertion, but the worst is the confused, muddled, dazed feeling in her head. Suffers from headache. Has lived in India, where meat or poultry has been on the table two or three times a day, but the quality being so bad she rarely took it. Not fond of sweets or fat, but eats much butter and cream, and her chief diet is milky puddings. Seen once only, but I heard some months afterwards that she had taken my advice about her diet and was "almost well."

Case 32.—Man, at. 42. Insomnia and depression. Has attempted suicide three times. Becomes confused in mind, so that he cannot take orders in his own shop. Not a great eater of meat; once or twice a week he goes without, and when he does take any it is only once a day, and then very little—not more than two ounces. Fish twice a week. Drinks much milk. When he feels low, which is pretty often, he eats nothing. Seen once only.

Case 33.—Schoolmaster, at. 29. Breaks down and cries for no reason; has to rush out of the room to save himself from making an exhibition of himself by an outbreak of weeping. On one occasion he rushed off to a doctor, and as soon as he reached the consulting room he broke down and wept. There has been some tendency to this for three years, but he has easily overcome it until the last month, during which it has become intolerable. I saw him on May first, just after Easter, and he had been keeping Lent very strictly, but previously he had eaten very little meat, never more than one cutlet or an equivalent amount a day. No other error in diet. No headache. Seen once only, but I heard from his doctor a month after I saw him that he had reformed his diet and was greatly improved.

Case 34.—Man, at. 66. Looks much older than his age, and complains of loss of memory of the usual senile type. Forgets in five or ten minutes an occurrence, such as a visit from a friend. Begins to be suspicious and to fancy that his money is being kept from him. He is very careful of his money, but forgets where he puts it. Forgets the names of his children. Suffers much from neuralgia. Is very fond of sweets, jams, and puddings. Spreads sugar on his bread and butter. Eats meat only once or twice a week, and then very little. Seen only once.

Case 35.—Male, æt. 18. "I can't work. I can't do anything. I can't apply my mind to anything. I have a difficulty in getting up in the morning. It sometimes takes me an hour to dress. I get thinking about other things." A friend says there are times when the patient seems lost in thought and stands stock still, doing nothing; but when spoken to he can rouse up and go on with his work. He says he is a very bad meat eater. Never eats as much as there is on a mutton chop, nor anything near it. Not nearly as much as a slice off a sirloin. Lives chiefly on puddings, cakes, and bread and butter. Not fond of fat or butter. No headache. He is 5 feet 10½ inches, and still growing. Weighs 10 st. 5 lb. Seen once only.

Here are recorded a number of cases of persons who have sought relief from mental disease; and the first comment that they call for, that they cry aloud and clamor for, is that, of thirty-five cases of mental disease, only one could be certified as insane. I insist upon this with special emphasis because of the universally accepted doctrine that disorder of mind is equivalent to insanity—that disorder of mind and insanity are the same thing. The contention that I have urged for so many years that unsoundness or disorder of mind is not necessarily madness, has always been received by the people that do err in their hearts with contemptuous incredulity and open derision. Now, whatever my faults, and whatever my fads, I think even this people will admit that a patient must be undeniably sane if I cannot certify that he is insane; and of these thirty-five patients I could not have certified more than one; that is to say, three per cent. Of course, I do not expect this to make any impression upon my alienist friends, but I beg them to note this indefeasible demonstration that mental disease, mental disorder, or unsoundness of mind, is not the same thing as madness, but that many and varied mental disorders are compatible with complete sanity.

The peculiarities in diet which preceded and accompanied the mental disorder in these patients were mainly of two kinds—deficiency of meat, or excess of fat, starch, or sugar. According to current practice, the peculiarity of diet would be regarded as unquestionably the cause of the mental disorder; but so to regard it would be quite unjustifiable unless the association of the peculiar diet with the mental disorder satisfies one or more of the conditions stated above; and the reason is clear. Vegetarianism is common enough; mental disorder is common enough. On the doctrine of Probability it is certain that the two must coincide in the same person in a certain number of cases—in a number that cannot be exactly ascertained for want of exact figures. There is, besides, another source of possible error. It is quite rare for vegetarianism to be the only fad of the vegetarian. Almost always he has a stock of fads. He cultivates a number of what may be called anti-isms. He is anti-alcoholic, anti-vivisectionist, anti-vaccinationist, anti-capitalist, anti-bellumist, anti-patriotist. He is anti-penalist, and would provide all gaols with pianos and newspapers, beer and skittles. He is anti-restrainist, and would abolish all lunatic asylums,

rightly from his own point of view, for so he would escape the risk of losing his own liberty. It is, no doubt, possible to hold some of these opinions with reasoned conviction, and after examination of the evidence; but it is not so that the faddist holds them. He holds them as mere prejudices. He attaches to them a very disproportionate importance. He advocates them in season and out of season, and with intemperate zeal. He erects them into a religion, of which he is a fervent missionary, and of which he is proud to be a martyr in any small way which does not interfere too much with his comfort, or if it does, brings him a consoling notoriety. He regards any means of proselyting as justifiable, and lies conscientiously in furtherance of his fads. A mind of this nature is unbalanced. It is not insane, but it occurs in people who have insane relatives, and who are apt themselves to become insane. We should expect, therefore, to find among vegetarians an undue proportion of insane persons. For this reason I have omitted from the cases adduced every case in which abstention from meat was a fad, and have included those only in which meat was eschewed either because it was distasteful or because it was not procurable.

That very definite peculiarities in diet did precede and accompany the mental diseases in the cases I have recorded is unquestionable. What is now to be determined is whether this antecedent and accompaniment can rightly be considered a cause. To this end we must make four inquiries:

First, is the action that we conjecture to be the cause, that is, the action of the diet upon the patient, isolable? In other words, can we separate it from other actions on the patient so as to ascertain beyond doubt that the change in the thing acted on is due to that action, and to that alone? At first sight it seems that we cannot, for we know very little of what other actions tending to produce mental disorder may or may not have been incident upon the patient at the time. In some of the cases—viz., Cases 10 and 13—the patient was alone from morning till night six days in the week, which we may conjecture was inimical to mental health; in other cases there had been worry, anxiety, and other stresses. While, however, we never completely isolate the action, we can produce an approximate isolation by withdrawing the action that we surmise is the cause, and noting any difference in the effect during its absence, and, it may be, allowing it to act again and noting the effect of the addition. In several of the cases the rectification of the diet was followed by improvement of the mental health, and in some cases this improvement was rapid or immediate, and was great. In this respect Case 5 is extremely instructive. This patient improved very decidedly within a week of the rectification of her diet. She continued to improve, until at length she spoke of her recovery as a miracle. Then she had a relapse. The relapse was not coincident with a return to the faulty diet, but it was coincident with what, for the purpose in hand, amounted to much the same thing—that is to say, with her pregnancy. She now took, it is true, enough protein to nourish

her own tissues, but it was not allowed to nourish her own tissues. It was seized upon at once by the growing fetus, whose demands were paramount, and she was deprived of it. Nor did she improve when the child was born, but then, when the child was born, it was still her own food that nourished it. When, however, she weaned the child she rapidly recovered. It is difficult to avoid the conclusion that in this case the mental disease was dependent on the deficiency in the ration of protein, whose fluctuations it followed so closely.

It is one of the disadvantages of consulting and hospital practice that a large proportion of the patients are seen once only, and the result of one's adviee remains unknown. Of the thirty-five cases here recorded, fourteen were seen only once, and nothing certain is known of their progress; but of other cases seen only once inquiries were made, and it was found that they had so greatly improved that they did not think it worth while to come again. It is a fair inference, therefore, that some of those who were not heard of had the same reason for ceasing to attend. Taking, however, those only whose subsequent history is known, all but one recovered, or very greatly improved, when their diet was rectified; and these were more than half of the whole number seen. The total number is too small, it is true, to draw any very large or confident conclusion from, but as far as they go they show, among those as to whom the result is known, a rate between ninety-four and ninety-five per cent of recovery or of very great improvement, and this is too striking to be ignored.

Application of our second principle, that of constancy in the association of the effect with the possible cause, does not yield such a favorable result. It is certain that the positive association of an excess of fats or carbohydrates, or a deficiency of meat, in the diet with mental disease in the consumer is not constant. The denizens of Arctic climates, who live largely upon blubber, are not known to suffer disproportionately from mental disease, nor are those considerable populations of Eastern countries who live upon an exclusively vegetarian diet; but then it is clear that the circumstances are not the same, and no principle of logic is more important, though it is not mentioned by Aristotle nor acknowledged by professors of logic, than that circumstances alter cases. That indulgence in fat which may be disastrous to the dweller in a temperate climate, need not be anything but beneficial amid eternal ice and snow; and that abstinence from meat which may be fatal to an individual or a member of a race that is accustomed to a carnivorous diet may be innocuous to one who and whose ancestors have never tasted meat. Moreover, there can be little doubt that what is harmful in the absence of meat is the absence of protein, and this may be made up by consumption of vegetable proteins.

Nor is the negative association in the least degree constant. There is abundant experience that mental disease is by no means confined to those who indulge excessively in fats and carbohydrates and those who refrain from eating meat.

The third principle cannot be applied for want of data. When there are a great many people who suffer from mental disease, and in the same population a great many who commit those errors of diet, the doctrine of Probability assures us that there must be some in whom the two will be combined casually; and among the cases recorded Number 13 seems to be such a case. But it is quite impossible to apply this principle, and to discover whether or no the combination of mental disease with error in diet is more than casual concurrence will account for, until we know (1) the total population; (2) the number of cases of mental disease; and (3) the number of cases of error in diet, in the population. In the absence of data no conclusion can be drawn.

The fourth principle, however, is more fertile in results. It assures us that if a certain change in a thing follows, though only occasionally, an action on that thing, then, although from the mere occasional sequence we are not justified in calling the action the cause of the change, yet if in each case of the sequence the change exhibits a constant character, we may then properly infer that the sequence is causal. To take a cognate instance: insanity follows, though only occasionally, excessive and prolonged drinking of alcohol; but since insanity often occurs without this antecedent, and since the antecedent often occurs without insanity following, it would be quite unjustifiable to assert, on the mere ground of antecedence and subsequence, that the drinking was the cause of the insanity. When, however, we find that whenever insanity does follow prolonged and excessive drinking the insanity always has certain peculiar characters, which are never found in insanity otherwise occurring, the case is different. This constant quality in the result does justify us in presuming that the constant antecedent of that quality is the cause of the insanity. Can we then apply this principle to the cases before us? I think we can. Here it becomes necessary to separate the two factors of excess of fats and carbohydrates on the one hand and defect of meat on the other, and to consider each by itself.

If the cases in which an excess of fat was consumed are examined it will be found that whatever other symptoms they complained of, they all suffered from severe headache. This is not a new observation. The connection has been thoroughly established by Dr. F. Hare in his excellent book on the *Food Factor in Disease*. The cases here adduced are a mere addendum of his observations, and pretend to no originality. They are, however, of value as corroboration by an independent observer of his views. While, however, the headache is the most prominent and troublesome symptom in these cases, it is not the only one. It is well known that attacks of migraine are often accompanied in them by confusion of mind, which occurs even at times when the patient is not suffering from headache. There is no case among those here recorded in which headache was complained of when there was no excess of fat in the diet. From this it must not be supposed that I suggest excess of fat as the only cause of headache; I suggest merely that deficiency of meat alone is not a cause of headache.

It seems, however, that it is a potent cause of *confusion of mind*. In case after case in which the diet was subsequently found to be deficient in meat, the mental state is described in almost or quite the same terms: "I feel muddled and dazed"; "A wave of confusion comes over me"; "I am so muddled about my work"; "I have such confusion in my mind"; "I feel half-dazed, and don't know what I am doing"; "My mind is confused"; "My head is in a muddle"; "I cannot think"; "I have a muddled feeling in my head"; "I cannot apply my mind to anything"; "I am half-silly": "There is something in my head that causes everything to be jumbled up"; and so on.

Depression is almost as common, and is in some cases very severe. In several cases it led to contemplation of suicide, and in one to repeated attempts; perhaps, since they were repeated, they were not very determined, but still they were attempts.

Screaming fits and motiveless weeping and laughing occurred in several cases among the women.

Defects of memory, especially of the business memory—that is to say, forgetting to do things at the proper time—was noted in several cases. It is a part or a form of the mental confusion.

In three cases there were hallucinations, and in one of these the hallucinations were extraordinarily vivid, and were of sight and hearing coordinated. Case 14 would of itself serve as a text for a discourse upon the origin of ghosts and the nature of ecstatic visions, of celestial visitors, of supernatural revelations, and so forth. It is unfortunate that I was unable to follow up this case, and I may say that its very peculiar character makes it doubtful whether the mental state owed any of its origin to the diet, which, however, was certainly very defective. On the other hand, it could be urged that Cases 17 and 20 are halfway houses on the road to the same destination.

Many other inferences can be drawn from these cases, and there is one inference that will certainly be drawn, however much I may deprecate it and protest against it, and that is that I have asserted that every case of mental disease is due to excess of fat or to deficiency of meat in the diet. I make no such assertion. Obviously the cases here related form but a small proportion of those that have come under my notice since I first began, several years ago, to investigate the diet of my patients. In only a small proportion of cases could I find any definite fault in the diet; and where a fault existed, it was not always excess of fat or deficiency of meat. It surprised me to find in how many cases people live very largely on milky puddings, and I was in doubt in many cases how far the symptoms were due to deficiency of protein, and how far they were due to excess of starch and sugar. In Case 27 I have little doubt that much was due to excess of starch, and I always made a point of inquiring into the relative proportions of all the constituents in the diet.

A word may be said as to the method of inquiry. In this, as in all

things, it is most important to avoid leading questions in opening the examination. My practice is to ask, What do you have for breakfast? and so on for each meal. The next question is, Is there anything to eat that you are particularly fond of? Meat? Sugar? Fat? Milky puddings? Then, Is there anything you particularly dislike? It is important to remember that people do not reckon butter as fat. Many patients declare that they dislike fat, and never eat it, but when the question is put to them, they will admit an inordinate fondness for butter.

It should be remembered also that there are wide differences in the capability of different persons to dispose of the fat, starch, etc., that they consume, so that what is moderation for one may be gross excess for another.

A point that, to economize space, is not brought out in cases here recorded is that those symptoms that seem to be due to excess of fat, starch, and sugar in the diet, and that are relieved by diminishing these constituents, are almost always worse in the morning, clear up towards afternoon, and are often absent in the evening. Hence I never omit to inquire, What time of day are your symptoms worst? and whenever I hear that they are worst on waking in the morning and diminish as the day goes on, I make very stringent inquiry into the diet, no matter what the symptoms may be.

Finally, let me assert once more that I do not hold that there is only one cause of mental disease. If I did so hold, I should be little better than a psycho-analyst. *My contention is, and I think it is borne out by these cases, and by the application to them of true principles of ascertaining causation, that in a certain number of cases of mental disease, small in proportion to the whole, but considerable in the aggregate, the disease is due to error in diet, and can be cured by rectifying the error in diet.*

## SOME INTRODUCTORY REMARKS ON THE ORGANIZATION OF RESEARCH\*

BY DAVID ORR, M. D., C. M.

In opening this subject, I wish to give first a few preliminary words of explanation. The object of this paper is to raise the points germane to the organization of research. Organization, to my mind, is the most important point in research, and the only foundation upon which successful investigation can rest. Anything which follows will be clearly understood to be merely an opinion expressed in order to open discussion and invite criticism. The illustrations given of the difficulties attending investigation in our subject are nothing more than examples: they are not meant to be regarded as definite lines along which research should be conducted, but rather to be read in the sense of evidence brought forward in favor of a serious and coordinated effort on the part of those who would attempt to discover the pathogenesis of morbid psychology and neurology.

Research invariably widens our horizon by accumulating knowledge and broadening our point of view, and the principle underlying all research in regard to disease should be to elucidate the mechanism of normal processes, and the manner in which these become abnormal. It frequently happens that the study of morbid processes provides the investigator with definite knowledge regarding the normal function. Cretinism is an example of this. It is only by studying normal and faulty mechanisms that we arrive ultimately at logical conclusions which warrant argument from a general to a particular. It is to be regretted that much time and labor is frequently expended in arguing in the reverse direction.

Research into the causation of insanity up to the present time has been either isolated, neglected, or starved, and this for reasons too obvious to require any further discussion: and a perusal of the literature shows that very much more could have been accomplished with the aid of encouragement and coordination. It is true that at one period of our knowledge isolated effort could make some headway, and early workers must be congratulated on achieving many solid and illuminating results; but then we stood upon the threshold of discovery; at the present day the problems are much more complex, and the cooperation of several special workers has become essential. In early days, and even up to fifteen years ago, volumes were written on the morphology and connections of the nerve cell. The work was of a comparatively simple and straightforward nature, and could be carried out with simple apparatus, hence isolation did not militate to a serious degree against research. Now, however, we have arrived at a stage when it is admitted that the teaching to be derived from altered morphology has ceased to carry us further unless supplemented by the study of the many and intricate processes which lie behind morbid anatomy.

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\*Jour. Ment. Sci., 1915, lxi, 412-423.

Modern investigation demands more time and study from the worker than formerly. Research has come to mean specialization in a branch after a thoroughly broad preliminary training. In the research which specially interests us a sound knowledge of general pathology must be brought to bear upon an organ—the brain—whose anatomy, though by no means completely known, is demonstrated to be of exceeding complexity, while its physiology is still in its infancy. The anatomy of the nervous system still provides a fund of problems; add to these the problems in physiology and pathology, and it can readily be imagined how many difficulties face the untried, and even the experienced investigator.

This Society has recently appointed a special sub-committee to consider what steps should be taken to assist investigation into the causation of insanity. Simultaneously sporadic efforts are being made towards the same end, and it seems probable that these will take the form of central laboratories to supply the needs of either one large and densely populated county, or of several smaller counties. I may say at once that my firm conviction is that no material progress can be made without a central laboratory properly constituted and equipped; and it is this necessity for a central laboratory to which I wish to draw attention.

If we accept the thesis that a central laboratory, furnished with modern appliances and conducted on broad lines, is the ideal at which we should aim, then let us inquire into what is necessary to insure the justification of its existence, and the carrying out of an ideal policy.

In the establishment of a laboratory there are two cardinal factors to be considered: function and equipment. These are inseparable. Function has no existence without equipment; and equipment is wasted unless skilfully directed towards a definite end. If asked to define what is meant by the function of a research laboratory, a large number of persons might answer "a building in which research is conducted"; and they would be partially right. But a most important part of the definition is not included in this. There is a great deal more comprised in it than that. One might offer a provisional definition by saying that the function of a research laboratory is to conduct research, and to educate a series of workers, so that they and those whom they in turn instruct will be fitted to carry on the work of the future by advancing upon the discoveries of the present, and thus secure a continuity of research. In saying this I am quite conscious of the fact that there are still many who disparage the patient research on which alone scientific therapy can be based, and consider that the provision of education for posterity is a subsidiary matter. A little knowledge of the elements of the problems involved might change their point of view, and thereby spare us that glib pseudo-scientific criticism which thrusts its way into argument from time to time. Research is an exceedingly slow process, and it is obvious that those who would conduct it quickly grasp neither its difficulties, its scope, nor its application. Research, coincident with investigating the causation of disease, must be utilized to teach others

what is already known about it, and point our definite lines of inquiry. It is only thus that the organization and the potentiality for research of a laboratory can be utilized to their full capacity, and contribute results which justify the legitimate expectations of the original founders.

Now let us look a little more closely at the function of a research laboratory in so far as it concerns the elucidation of problems of insanity. In no branch of medicine is the field so wide, or are the difficulties so great as here; and no other investigation requires so much general and special knowledge. Breadth of training and faultless technique are absolutely essential, for, to the errors so prone to creep into investigation in general pathology there are added those peculiar to the nervous system itself. The scope of our specialty, and the requisite training for the investigation of its problems, are all expressed by Professor Lugano: "There is no doubt that all sciences have a reciprocal connection, and each advances by taking advantage of the progress made by others. In practice it is not possible to limit one's attention to a single branch of a complicated subject \* \* \* in no science do so many sciences dove-tail into each other as in psychiatry. Therefore the alienist must—as much as the time at his disposal and his individual capacity permit—take an active part in work developing in neighboring fields of research, cultivate other sciences and help them to progress, in order to further the progress of his own. The mere study of the psychology of diseases of the mind, to which psychiatry should be reduced according to some, is a necessary study, but by itself ineffectual and sterile. Alienists are bound to leave their own field, fashion and solve for themselves their own special problems in the other sciences. Only in this way can they contribute to the creation of a complete psychiatry.<sup>1</sup>

Everyone must admit that Lugano states the case with the utmost candor. He is careful to avoid minimizing the difficulties connected with the problem, and one of his remarks is worthy of special note: "in no science do so many sciences dove-tail into each other as in psychiatry."

There is a multiplicity of problems connected with insanity, which can be grouped as anatomical, physiological, pathological, bacteriological, chemical, and serological. The acquirement of the fundamentals of this array of special subjects demands time, patience, and practice. Each requires for perfection continuous and thorough investigation, and no single one can be developed without assistance from the others. Therefore anything short of a policy which aims at breadth, efficiency, and insured continuity, is predestined to reap possibly partial success, to arrive very probably at erroneous results, and to court in the end dismal failure. This may seem too pessimistic a view perhaps; it is, however, one easily capable of illustration.

The history of scientific investigation teems with examples of the futility of attacking problems from too narrow a standpoint. Look, for example, at the subjects of aphasia and general paralysis of the insane. In the case of aphasia brilliant clinicians have in turn held the field since the

days of Broca, theory has succeeded theory until scientific dogma reached the very limit with Marie's assertion of the paramount importance of the lenticular zone. And now this view, though ingenuous and comprehensive, and for a time popular, has in turn collapsed before unbiased scientific criticism, and all we know now is that our conceptions regarding aphasia have been far too narrow, and the localization of the centers for language, and their interrelation, can be learned only by skilled investigators who are prepared to examine the entire brain of any given case, and who are able to correlate the pathological findings with the clinical symptoms. To some this may appear to be an unusually uphill, thankless, or even unnecessary task, but we must bear in mind that anatomical and histo-pathological researches have demonstrated, that owing to the complexity of axonal and collateral connections in the cerebral cortex and other portions of the nervous system, a lesion in one single area of importance seriously disturbs the function of others with which it is in anatomical connection. Hence at least two factors enter into the argument at once—the immediate local effect of the lesion, and its more distant or remote effects.

It must be allowed that here the tyro, however enthusiastic, and however gifted with introspective reasoning, is lost. Without an intimate knowledge of the anatomy and histo-pathology of the nervous system, his efforts are preordained to failure. Dejerine, one of the first neurologists of the day, states the position clearly and concisely in the following words: "One can readily understand that in the study of the lesions in aphasia macroscopic observation is insufficient; microscopic examination in serial stained sections of the affected hemisphere, or even of both hemispheres, is indispensable. This is the only method of determining the limits of the lesion, and of resolving the questions still under debate."<sup>2</sup>

I have chosen aphasia as an example purposely for the reason that the causative lesion is almost invariably gross. One can readily imagine the multiplicity of pitfalls which await the investigator who sets out to solve the pathogenesis of paranoia, epilepsy, or the so-called dementia praecox, in all of which the morphological changes in the cerebral cortex and elsewhere are ill-defined, and cannot by any stretch of imagination be termed pathognomonic.

General paralysis of the insane presents another variety of problem. It is a frequent clinical type, is widespread, and has always attracted a great deal of attention. In this disease it would appear that we have to deal with a diffuse sub-acute inflammation combined with neuritic degeneration, and from the histo-pathological appearances of the majority conclude that a toxic-infection is the pathogenetic agent. The consensus of opinion regards both dementia paralytica and locomotor ataxy as late manifestations of a syphilitic infection, and we may grant that this opinion is correct. But, even possessed of this knowledge, are we much further on? Not yet. I fear; for, with the failure of those two diseases to yield to anti-syphilitic treatment, we are bound to confess our ignorance of their mechanism of

production. Numerous investigators have supplied us with a complete picture of the morbid histology; the *Spirochete pallida* has been demonstrated in a certain percentage of cases in the nervous system; while serology and cytology have opened a way to the confirmation of diagnosis by examination of the serum and cerebrospinal fluid. But the problem remains unsolved, and shall remain so until we have filled in that hiatus which lies between tertiary syphilis and parasyphilis of the central nervous system.

The two illustrations so briefly touched upon could be multiplied *ad infinitum*. The etiology of idiocy, and the various grades of feeble-mindedness, nerve lesions due to autointoxication, to disturbance of the ductless glands, and many other questions, are all complex studies.

For example, the condition known as primary degeneration of the myelin sheath is still very imperfectly understood. It occurs in the acute insanities, the infectious fevers, pellagra, alcoholism, diabetes, leukemia, Addison's disease, metallic and bacterial or toxic poisoning, in fact, wherever there is malnutrition or interference with normal metabolism. The myelin sheath undergoes atrophy, leaving the axis-cylinder thinly covered or denuded; and certain portions of the central nervous system are affected in preference to others. When the exciting cause is removed, the myelin sheath is regenerated. Now closely linked with this question of myelin degeneration and regeneration there are problems in chemistry which deal with the source of certain constituents vital to nervous tissue. Here obviously the neuropathologist and chemist must combine. Some progress certainly has been made, but there are still difficulties in the way which baffle the expert in pathological chemistry.

Again, there is the symptom called apraxia, a profoundly interesting example of disturbed cerebral function. One of its varieties, ideational apraxia, occurs in diffuse functional mental disturbance, such as mental confusion and dementia praecox; it is also found where there are superficial destructive changes such as occur in dementia paralytica, and in arteriosclerotic senility. The symptom consists in loss of the faculty of knowing how to execute an action. The alteration is purely psychic, and, "as the psychic functions represent the complex product of activities of perception and association disseminated throughout the entire cortex," it is evident that this faculty has no regional or lobar representation.<sup>2</sup> The morbid process causing this symptom may be anatomical or functional, and is as diffuse as the cortical substratum of psychic function. This field of the apraxias and the aphasias is one of the most difficult of studies, but it seems highly probable that whatever is gained here will help to explain the symptomatology of much morbid psychology.

There remains much to be worked out in connection with the acute, sub-acute, and chronic infections of the nervous system. We can now draw a broad distinction between the lymphogenous and the hematogenous infections from their specific histological reactions, and their different anatomical distribution. It may now be accepted that tabes dorsalis and dementia

paralytica are lymphogenous tox-i-infections, and that the path taken by the virus in the case of tabes is along the sheath of the peripheral nerves, and thence into the root entry zones of the posterior columns of the cord. But where is the infective focus? At what point does the virus enter the perineural lymph circulation? These two questions still remain unanswered; it is not too much to say that their solution would open the way for successful therapy.

The explanation of the peculiar distribution of many non-systemic pseudo-tabetic lesions amongst the fibers of the posterior columns of the cord is still pure speculation. It has been observed that these at first assume the shape of the letter V, with its apex pointing forwards to the commissure, and a limb diverging backwards of each side of the postero-median septum. The region of the cord affected extends from the lower cervical to the upper lumbar segments. The myelin sheaths in the affected area undergo atrophy, and, in addition, edema of the cord is often observed, especially when the lesion is associated with a cancerous growth affecting one of the abdominal organs. The degeneration is not the result of nerve cell destruction. Now it is of great interest to remember that if the abdominal cavity be infected experimentally, the sympathetic nerves and ganglia participate in the resulting inflammation, and examination of the spinal cord reveals the above-mentioned V-shaped lesion in the posterior columns of the cord, sometimes accompanied by edema. The vessels of the entire central axis are dilated, many showing hyaline thrombosis of varying degree, and Dr. Rows and I have observed more recently coagulation necrosis of the nerve cells in certain areas of the brain, and ischemic softening with all the characteristic cell reactions. The peculiar distribution of the myelin degeneration is against accepting a general toxemia as the sole cause of the lesion; while the dilatation of the blood-vessels, the hyaline thrombosis, and the edema, due presumably to increased permeability of the vessel walls, suggest very strongly that an additional mechanism, namely disturbed vasmotor action, has come into play. In favor of this view we have the fact that when the suprarenal capsules have undergone degeneration, and there are symptoms of glandular insufficiency, the lesion in the spinal cord is situated precisely in the portion of the posterior columns indicated above. Obviously, therefore, the sympathetic system is a field which we cannot afford to neglect, and one whose investigation may prove as fruitful to psychiatry as to neurology. Much suggestive material on this point may be found in a paper by Dr. Turney,<sup>3</sup> in which he draws attention to the part played by the sympathetic in certain neuroses. One example in particular which interests us as alienists is the occurrence of a "dream-state," with rapid recovery of orientation, followed by considerable edema of the conjunctiva. Here we have one definite physical concomitant of a transient mental state. I mention this case specially on account of the edema, because, as we have already seen, edema of the central nervous system is very common when the sympathetic ganglia and nerves

are involved in morbid processes. We must, therefore, include this part of the nervous system in our investigations, especially when we propose to study those neuroses called for the time being functional.

The few examples which have been lightly touched upon are sufficient, I think, to draw attention to the variety and complexity of the problems in our specialty. It is this complexity which calls for a wide outlook; therefore we must make liberal provision for this in a center designed to afford material aid to the investigator. And this brings us to the practical part of laboratory organization.

In the first place there must be a complete reciprocity between the laboratory and the asylum, for clinical work can never be divorced, if accuracy is to be assured, from the guiding influence of pathological observations and research. The function of the laboratory, therefore, is to provide the medical staff of the asylums with a broad and practical grasp of what has already been done in the field of research; it must also give advice on special points to those who have profited by this training and have commenced independent investigation. Sound preliminary training must be the motto, and periodic return to the laboratory an essential of any system which aspires to a continuous requirement of definite knowledge.

The allusion to sound preliminary training raises the question of equipment of a central laboratory. Equipment includes the teaching staff, the subjects to be taught, mechanical appliances, and other furnishing. The two last may be left out of the discussion, as the furnishing of a laboratory is never neglected by any chance. It is the appointment of some competent person to make use of the laboratory which is so often overlooked, and one could point to many instances of this waste of opportunity.

The scope of equipment, or in other words the amount of aid to be given to research, is of primary importance, and forms the whole basis of modern scientific investigation. A central laboratory, to be effective in the field of modern psychiatric investigation, must make provision for studies in the anatomy and physiology of the central nervous system, in psychology, neuropathology, and in bacteriology and serology. Anyone who intends to investigate the causation of nervous disease must have a grasp of the essentials of those subjects. And here I would insist specially upon a sound knowledge of neuropathology. This is the basis of all work in neurology, that is, a neurology which embraces the whole nervous system, and does not recognize the boundary line between brain and cord pathology which is an artificial product of consulting medicine, but in research has no existence. Neuropathology also possesses this special advantage in a teaching scheme, that its study not only provides instruction in the nature of morbid processes, but teaches anatomy and physiology as well. For example, if the student proposes to investigate one case of transverse myelitis, and takes a section from each segment of the cord and medulla suitably stained for demonstration, he sees for himself the ascending and descending degenerations, subsequent to the destruction at a certain level; that is, he sees much of the

anatomy of the central nervous system, and so learns to think of disturbed function in association with definite paths of conduction. I feel sure that a sound knowledge of neuropathology and anatomy is the best corrective to the tendency to advance premature hypotheses, and to haphazard introspective reasoning. Every day brings forth more evidence of the value of neuropathology in elucidating the normal and morbid functions of the various parts of the nervous system, and in establishing correct criteria as to the mechanisms concerned in the causation of nervous disease.

No training can be complete, however, without adequate clinical instruction, as all pathological investigation is not only directed towards the elucidation of morbid processes, but also towards a scientific explanation of symptomatology. The two go hand in hand to found the treatment of disease upon a scientific basis. I am not of opinion that the county asylum is the best place in which to learn clinical psychiatry, that is to say, a clinical psychiatry which postulates a study of the genesis and early symptomatology of mental disease. Our county asylums rarely receive a patient in the early phase of the disease. The malady has almost invariably passed through the stage of development before an authority sanctions or recommends alienation, hence the asylum medical staff misses the most instructive phase, and loses the opportunity of acquiring practice in early diagnosis and treatment. A reception house, clinic, or out-patient department—call it what you will—while of undeniable benefit to the patient, especially if untrammelled by legal formalities, would functionate as a teaching school in a similar fashion to any general hospital, and thus be of great assistance to the student of mental disease. The maximum of benefit would undoubtedly be derived by thus assuring the continuous co-operation between clinical and pathological work, which is the sure foundation of scientific investigation.

We were provided with an excellent illustration of the value of correlating symptoms with morbid anatomy at the last quarterly meeting of this Association, when Dr. Stewart read a paper on, "Meningo-vascular Syphilis associated with a Retro-olivary Syndrome." Amongst others there was a destructive lesion in the medulla situated behind the inferior olive, and involving the fibers of sensation in the *formatio reticularis* and the descending root of the fifth cranial nerve on the same side. The symptoms were crossed anesthesia of the syringomyelic type affecting the limbs of the trunk, accompanied by anesthesia on the same side of the face. We were shown a large number of lantern slides before the limitations of this particular lesion were defined, and the demonstration emphasized the great importance of locating the exact anatomical site subserving the disturbed function. Many points in the case were omitted owing to lack of time, but what we saw enabled us to appreciate the great value of supplementing symptomatology with trained pathological investigation.

So far we have glanced only at the scientific equipment required by the investigator; we have now to consider how best to provide the personnel of a laboratory instituted to impart the knowledge necessary for research;

and although the subjects mentioned may seem a formidable curriculum the difficulties attending the provision of teachers are much more apparent than real.

A central laboratory must have a director at its head, and the amount of skilled assistance afforded him will vary as a result of several factors, but it may be taken for granted that the permanent staff will never be sufficiently strong to teach all the special subjects in the curriculum. To subsidize a group of permanent experts would be ideal, but very expensive, so we must adopt another and more economical plan which, however, would prove no less efficient, and requires only one proviso for its success, namely, that the central laboratory shall be attached to, or in the immediate vicinity of, a medical school, whose professors and lectures can be utilized for teaching purposes and expert advice. This would necessitate co-operation between the administration and governing bodies of the central laboratory and the medical school, a matter which should not present any material difficulty, and an arrangement beneficial to both parties. For example, the professor of anatomy could give special lectures on the cerebral cortex, or other part of the nervous system upon which he specialized; the services of the professors of physiology and pathology could afford invaluable assistance in the application of those subjects to the nervous system. Those working in the central laboratory would derive a constant stimulus from association with the broad work of the university staff, would always be within easy reach of help on special points, would suffer less from that tendency to narrowness so easy to acquire, and so fatal in specialism, and would automatically assimilate the spirit of reciprocity so essential to success.

Nevertheless, it must not be supposed that, with a central laboratory established on lines somewhat like those indicated above, the work is finished. To assume so would be to deny to the asylum itself a most important and necessary rôle. Each asylum must have its own pathological laboratory in which those who have been trained to understand the broad neurology shall work out problems for themselves, and, by turning when in difficulty to the central institution for advice and criticism, they shall be enabled to rest satisfied that hasty conclusion is reduced to the minimum, and that they have aimed at the "verification of even those deductions which seem founded on the widest and safest inductions."<sup>4</sup>

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## THE STATE AND THE INSANE

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The thesis which I shall try to maintain is that the rapid increase, during the last generation, in the number of insane persons confined in our state hospitals and asylums is due to the laws governing the admission, detention and discharge of patients in those institutions.

Dr. Henry M. Hurd has pointed out that owing to pioneer conditions the care of the insane in America did not develop in a natural way to evolve a system that was adapted to the needs of the country. On the contrary, the dependent classes early became identified with each other. If harmless the insane were bid off each year with other paupers to the person who would care for them at the lowest figure. If excited or destructive, they were placed in pens or cages in the almshouses or in jails. Utter neglect was the rule and no thought seems to have been given to anything except custody.

The first institutions to be established for their care were organized by private philanthropy, the Pennsylvania Hospital, the Hartford Retreat, Bloomingdale Hospital, the Friends Asylum, the McLean Hospital, are examples. These splendidly endowed hospitals, though most of their patients are from the well-to-do class, still care for a number of indigent cases. It was only when the magnitude of the undertaking became apparent that the states began to make provision for this class in special institutions.

It is rather remarkable that as soon as the states made provision for the insane, however poor and incomplete that provision was, private philanthropy no longer concerned itself with the subject. Though millions of dollars are given annually to hospitals for physical diseases practically none is given for the benefit of the insane, and though education is admittedly a function of the state, yet our large universities are, many of them, richly endowed. Even when the states began to make provision for this class it was done reluctantly. The case of New Hampshire may be cited:

Philanthropists viewed with distress the neglected condition of the insane in county houses and in families where the pauper insane had been "bid off" to the lowest bidder. Petitions poured in upon the legislature for the establishment of a State hospital. Physicians delivered addresses before the legislature, philanthropists urged the measure session by session and the Governors were most importunate in their annual messages and yet for eleven years the agitation continued before an institution was established at Concord.

It is to be wondered at that the welfare of the insane abandoned by private charity and unwillingly monopolized by the states, which still pursued a niggardly policy of provision and care, is still one of the greatest issues before the people today? When state hospitals were established it

became necessary to enact laws for their regulation. Viewed against this historical background, it can easily be seen how it came about that the laws then enacted and not yet wholly repealed were admirably designed to foster the accumulation of vast numbers of chronic patients in these institutions. *The fundamental error, shared alike by the law makers and the public, was and is to regard insanity as a condition and not as a disease and has resulted in the dominance of the idea of custody and not of prevention and cure.*

The finality of commitment was the prevalent idea in the public mind. It assumed that once immured behind the walls and barred windows of a lunatic asylum there was little prospect that the unfortunate person would ever be released. Hence it was important to be sure that no other course was possible under the circumstances. The presumption being that the patient was henceforth to be deprived of his liberty, such authority could not with safety be left to medical men but was a question that could only be determined by the courts. In some of our states the insane person must, even at the present time, be brought into the presence of a judge and jury and after the usual procedure of a criminal trial, be duly acquitted or convicted of having a disease which requires or entitles him to be treated in a special institution. Little thought was given to any feature of the case but that of danger to himself or others.

In the State of Oregon, even yet, the petitioner who seeks to obtain admission to a state hospital for a relative or friend, must make affidavit that he is dangerous to the public peace and welfare. It is true that physicians were called in to examine and give evidence and in some states one or two were required to be jurymen, but the public seemed unwilling to place much authority in their hands and the final decision of what was essentially a medical question was left in the hands of the court.

The modern view of the detention for treatment of the insane corresponds more nearly to our conception of the measure of quarantine. Insanity is a disease, the treatment of which is best carried out in a special institution, and during the attack the patient is possibly dangerous to himself or others, hence his detention in this special institution, even against his will, is justifiable.

The analogy goes still further. An insane person who is neither dangerous to himself nor others and for whom further treatment does not offer any prospect of cure, cannot with justification be detained if he can be suitably cared for elsewhere.

The public accepts the quarantine regulations of our boards of health and acquiesces in them so that interference by the court is almost unknown. This is due to two factors. The first is, the public is able to recognize the necessity of sequestration and second, there is no fear that the detention will be unduly prolonged.

We need not concern ourselves with the suggestion that segregation of the insane is advisable lest their offspring swell the ranks of the dependent

elasses in the next generation. *In the first place the insane, contrary to popular belief and in contrast to the feeble-minded classes are not as prolific as the normal population. In the second place, insanity is not transmitted as such.* What is transmitted (except hereditary syphilis) is a diminished capacity for adaptation to the world of reality, a diminished resiliency to withstand the buffeting of fortune. Whatever this subnormal condition, which we call insane heredity, may be it is the heritage of the family and is shared perhaps equally with the patient by his brothers and sisters and if all are not insane it may be only because some were fortunate enough to escape the difficult adjustment in life which the patient encountered and broke upon. Or the strain was softened or modified for them by the existence of other interests in life to which they could turn and which acted as safety valves. It will be futile to limit the offspring of an individual patient and to encourage it in his brothers and sisters. *It will be more practical for us to busy ourselves with removing the obstacle from the pathway along which the cripples must walk rather than to confine cripples indoors lest they fall.* How shall we go about to remove these obstacles or to strengthen the feeble so that they may yet walk in safety?

The old notion that insanity comes without warning like lightning from the sky, striking whom it would, has been completely abandoned. It is now recognized with great clearness that it is the culmination of a long series of faulty adjustments to life which oftentimes have their beginning in childhood. Because we have seen that insanity seemed to occur by preference in certain families, we have been too willing to cover up our ignorance of the true nature of its etiology by calling it hereditary, but a closer examination of the hereditary influence in a given family reveals only contradictions except in the case of feeble-mindedness, the consideration of which should be kept entirely distinct from insanity.

If we look upon heredity in insanity as only a predisposition to faulty habits of adjustment the problem of the prevention of insanity becomes far more workable and at once it is seen to resemble that great scourge of the human race, tuberculosis, for which so much is being done by measures of prevention, and for the occurrence of which heredity was once a sufficient excuse.

If we substitute for Koch's bacillus the faulty habits of adjustment the analogy becomes very close. In each case we have an individual susceptible to injury by a certain cause but he will continue in health if the cause can be avoided.

Looked at from this point of view, mental hygiene is easily thought about and can be effectively taught in the public schools, from the lecture platform and wherever thinking people assembled.

It is the duty of the profession to disseminate the principles of mental hygiene as is being done in the case of tuberculosis and where else should we look for leadership in this movement except to the hospitals for the insane?

Why have the hospitals for the insane not taken a more active part in this movement? The answer is, because they have not recognized the opportunity. They have been working with the ashes and cinders, amid the ruins of once fair structures and had no knowledge of the faulty construction of the building or of the nature of the combustibles that were stored in it. This is where we get a view of the baleful results of the laws to which I have already alluded.

The state, in the exercise of its monopoly of the treatment of the insane, says who shall be treated and when the treatment may begin. He must be dangerous, he must be suicidal, the public peace and welfare must be menaced by his presence, therefore in the majority of cases he must be incurable. It mattered not that the patient himself felt that something was going wrong with his mind and fearful for his sanity knocked at the door of the asylum and asked for help. "No indeed," he was told. "*We only take in lunatics, the fact that you ask for admission indicates that you have reason and judgment. Go away until you become certifiable.*"

But few states permit voluntary admissions and those only in recent years. The wealthy and progressive state of Ohio tolerates voluntary patients in its state institutions, but lest their numbers should overtax the existing facilities for caring for the chronics the number in each hospital is limited to five.

The situation is exactly the same as if the hospitals for tuberculosis should refuse to receive the incipient cases and admit only those in the advanced stages of the disease.

New York has provided for voluntary admissions since 1909, and last year 425 such cases were treated in the state hospitals, and the recovery rate in this class is high.

The scope of my paper does not justify a detailed discussion of practical measures of prevention and I shall say only enough to point out the importance of this work. That much can be done in this direction has become manifest by the recent advances in our knowledge of the rôle of syphilis and alcohol, two definite and easily preventable causes which together account for more than a quarter of the admissions directly and enter as a contributory factor in a much larger proportion.

Some very useful work is now being done in demarking the various types of individuals, the characteristics of which are shown at an early age. Hoch has pointed the way by his delineation of the shut-in child, among the ranks of whom nearly all the cases of dementia praecox are later recruited.

The burden of the custodial care of the unrecovered patients has grown greater year by year. In the State of New York, with 10,000,000 inhabitants caring for 33,000 insane, the annual increment is about one thousand patients, which is the equivalent of a new large hospital every second year. That State for next year has appropriated for the support of the insane, the sum of \$8,136,076 and it is estimated that to relieve the present over-crowd-

ing and provide reasonably for the future, \$25,000,000 should be made available at once.

At first glance these look to be staggering figures, but that State is growing in population at the rate of 200,000 per annum and has a large proportion of foreign born, among whom the ratio of insanity is much higher than among the native population.

It is my conviction, based upon observation of twenty-five years, that if there is any increase at all in insanity in the native population it is relatively small. State hospitals have become popular, the old horror of them is passing away and there is an increasing tendency to commit to them old and harmless dementes whose care at home was a matter of duty and family pride a generation ago. More than half of our patients are beyond fifty years of age.

No sooner is the old person removed from the household, because of some transient excitement or depression which renders his further care at home difficult, than the family re-adjusts itself to his absence. The finality of commitment is accepted, often the family disintegrates, the members taking up new interests, the house may be disposed of. A few months later the excitement or depression has passed off and he is again in his former condition of quiet dementia and could be suitably cared for in a private house, but no home is open to him. One of that year's increment is accounted for.

As it is important to provide for early treatment, it is equally important to provide for prompt discharge when residence in the hospital offers no further benefit to the patient or the community.

The State Hospitals should be training schools for physicians and nurses desirous of doing special work in psychiatry and their facilities under the direction of competent instructors should be made more generally available, both for students and for post-graduate work. The number of physicians in general practice who have had an adequate training in psychiatry is deplorably small and they are to be found as a rule only in the larger cities. The result is that early symptoms of mental disorders escape recognition or are treated with tonics or hypnotics where often a searching inquiry into the patient's history would reveal the true cause to be a conflict, perhaps a difficult domestic situation, to which he cannot adjust himself but which the advice and authority of the physician could speedily remedy. Until this is done medication is useless and foolish. Two recent cases come to mind as illustrations, both women with symptoms of melancholia, loss of interest in life, and discouragement. In one case a mother-in-law, and in the other a sister-in-law were eliminated from the family by my advice, with happy results. Neither of these patients attributed their depression to its real cause but supposed as their physicians did, that it had a physical basis.

It cannot be expected that the general practitioner will acquire more than the fundamentals of psychiatry but even these have not been given in

the medical schools with but few exceptions and only recently. The revolutionary changes in our conception of the nature and causes of mental disorders which have been taking place during the last ten years have left the general practitioner far behind. The result is that the knowledge which has been gained of the nature and particularly the causes of mental disease are not being utilized in a practical way.

That the care of the insane must remain a state monopoly is inevitable from the magnitude of the undertaking, and the time has now come when for his own protection it must do more than care for the advanced cases committed by the courts. It must take measures to conserve the mental health of its citizens in as vigilant and practical a way as the boards of health now deal with communicable diseases. This can be done by fostering the establishment, under state supervision, of local agencies in co-operation with the state hospitals, such as psychopathic wards in general hospitals, mental clinics or dispensaries and the employment of physicians and nurses as field agents to assist in the care of patients in their homes.

There should be established under state supervision, and with state aid, in one local hospital in every town, a psychopathic ward for the early treatment of mental cases requiring such care and a dispensary where physicians may come with their patients for consultation and advice. The physicians in charge of this work should be attached to the staff of the nearest state hospital and, to insure thorough co-operation with and control by the parent institution, he should receive at least a part of his remuneration from the state.

The attempts of small political divisions as counties and towns independently to care for the insane have not worked out successfully. This is so well known as to require no elaboration in this paper, but the state hospitals are, in nearly every state, in responsible hands and the standards are as good as the legislature will support. Hence the suggestion that the local psychopathic wards and dispensaries should be placed in charge of physicians who are members of the staff of the state hospital and subject to its authority. Such details of men for special duties are common in the army as instructors in military schools, etc., and with a minimum income guaranteed such positions would prove attractive to the older and best qualified men in the service. In this way very close co-operation could be secured between the hospital and the local establishments. Every patient would first be under the care of the resident alienist and only upon his advice and for satisfactory reasons would he be passed on to the state hospital, and as soon as was deemed advisable the patient would be returned to him for observation and care during convalescence. This would help to prevent the loss of interest in the patient by his family. Many unrecovered cases could live at home in safety and comfort under his tutelage, where now, with no trained supervision, the hospital authorities feel reluctant to discharge them.

That psychopathic hospitals diminish the number of commitments to state hospitals has already been demonstrated. The Psychopathic Hospital at Ann Arbor, Michigan, found it necessary to commit only 28 per cent. of its patients. The Psychopathic Hospital at Syracuse, New York, committed only 95 of the 245 patients admitted and apparently insane, 38 per cent. Pavilion F, the Psychopathic Ward of the Albany General Hospital, the pioneer institution of this kind and one that is exceptionally well organized and conducted, last year cared for 410 patients, of whom only 113 were committed to state hospitals, 27 per cent. The average period of treatment was 23 days and the average number of patients in the Ward was 25.

Dr. J. M. Mosher, the attending specialist in mental diseases (and who was formerly first assistant physician in the St. Lawrence State Hospital), makes the following comment in his annual report:

"As the feasibility of the treatment of mental diseases in a general hospital has become more widely known during the thirteen years of operation of Pavilion F, there has followed a growing appreciation of the fact that abnormal conditions of the mind are not necessarily attended by loss of personal responsibility, or so complete defect of judgment as to render the victim unable to acquiesce in measures taken for his relief.

"Intelligent appreciation of his condition, sympathy with his distress, coming with an opportunity to place him under systematic treatment, and without formality, publicity or legal technicality, all contribute to his acquiescence in the suggestion that he enter the hospital. In many cases the restoration to health is relatively rapid, and the recovery of many patients in a comparatively short time has been a surprising revelation of the effectiveness of an institution of this kind."

Results of an encouraging kind have followed the establishment of mental dispensaries in Massachusetts and New York and the reports show that the attendance has been unexpectedly large. Briggs and Stearns in a report on the work being done along this line in Massachusetts, say: "At the end of seven months we can say that the out-patient department has proved a success and has met the fondest hopes of the Board." At one of these dispensaries in the City of Boston 358 visited in one month.

We shall make little real headway against what is popularly called "the rising tide of insanity" until facilities are provided for adequately dealing with the incipient cases. The public appears to have almost no proper conception of this problem. The unfortunate terms "sane" and "insane" are real hindrances to progress: It would be well for us if they could be blotted from the dictionaries. Any degree of mental illness or inefficiency is important enough for thorough investigation and correction; and let us not confuse the issue by consideration of such subjects as legal responsibility, testamentary capacity, etc., which are lawyers' terms and not useful in the consideration of the case as a medical problem.

If we could stop thinking about insanity and provide hospitals, dispensaries, and clinics for the treatment of mental illness of all degrees we should, for a time at least, have more work to do but would make some real progress where now we are marking time.

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## A CHARACTERISTIC ATTITUDE ASSUMED BY MANY CASES OF DEMENTIA PRÆCOX

BY R. H. STEEN, M. D.

The accompanying photograph illustrates an attitude when sitting frequently adopted by many cases of dementia præcox. The point to which special attention is directed is the position of the arms and hands. The arms are held close to the trunk, with, as a rule, the elbow-joint in a condition of stiff extension and the hands in pronation, and resting on the lower part of the thighs, or even on the knees. When the photograph was taken there was no special posing for the purpose of this note, the subjects merely being told to sit down. In the wards I have seen these particular patients as well as others maintain this position for hours at a time. They sit, as a rule, rigidly upright, for example, in the case of the man shown, whose head is erect with the eyes staring forwards. In other cases the body and head may be bent slightly forwards. Most frequently the feet and knees are found to be close together, but, as in the case of the woman on the extreme right, the legs may be kept apart.

I believe in most cases the muscles of the arms are in a condition of rigidity, but when I try to test the point the patient at once relaxes. The hands are slightly edematous and of bluish color, indicating bad circulation. The patients are all cases of dementia præcox of long standing, with the exception of the man, whose illness has lasted only twelve months. I am unable to suggest any explanation of this phenomenon. It is possible that it is an example of reversion. It is certainly well seen in the statues of ancient Egypt (see illustrations). I have therefore named it the "Ancient Egyptian Attitude". I am drawing attention to the matter, as it does not appear to be described in any text book, and may be of interest to the readers of this journal.



Fig. 1. To illustrate R. H. Steen's article, Amenhetep III. A characteristic attitude assumed by many cases of dementia praecox.

## THE SIGNIFICANCE OF INTRASPINAL PRESSURE IN DEMENTIA PRÆCOX

By BAYARD HOLMES, M. D.

During the past five years the study of the cerebrospinal fluid has occupied a prominent place in clinical medicine. The cytologic and chemico-physical condition of the fluid has become diagnostic of cerebral syphilis. In cases of dementia præcox, however, the cerebrospinal fluids have not attracted adequate attention.

The origin of the cerebrospinal fluids still remains in some doubt. The fact that the intracranial fluid is quite different in composition from the intraspinal fluid has been sufficiently determined by experiment and by clinical observation. The cytologic condition as determined by the cell count and nuclear observation, the physical condition as determined by the goldsol test, and the chemical condition as determined by exact estimations show a marked but still inexplicable difference between the contents of the ventricles and the contents of the spinal lake. It is likely also that there is a difference between the two ventricles themselves, if our interpretation of the findings in cerebrospinal meningitis are to be relied upon. It has been observed in several instances in this disease that the spinal lake may be sterilized and later by intraventricular aspiration and injection one of the ventricles can be sterilized while the other still remains infected. There may also be some difference between the intraspinal and the intra-cranial pressures under normal conditions of health, but records of such demonstrations are not at hand. In diseases such as tumor and xanthochromia there are great differences in pressure of obvious origin.

The physical condition of normal cerebrospinal fluid as obtained by lumbar puncture may be briefly placed as follows:

The fluid has a specific gravity of 1.006, with 1.003 and 1.008 as extremes (Plant, Rehm and Schottmüller; Sorrentino).

The freezing point is not so well determined or else it is not so fixed. Léri, and Pende also, place  $\Delta=0.590^\circ$  and Mestrazat considers  $\Delta=0.570$  to 0.590, while Saltmann and Fuch and Rosenthal find normally  $\Delta=0.535$  to  $0.530^\circ$ . There have been many disagreements among observers, especially Achard, Looper, Laubry and Widal, Sicard, and Ravault, ranging from  $\Delta=0.50$  to  $\Delta=0.61^\circ$ . It is likely that many of these observations were upon abnormal individuals.

The viscosity as determined by the Hirsch-Beck instrument is  $\eta=1.008$  to 1.024. (Galletta.)

The electrical conductivity of the normal fluid removed by lumbar puncture is subject to some variation and is not yet reduced to clinical availability. Fuch and Rosenthal make  $\times=0.0159$ , while Iscovesco places  $\times=0.0143$  and 0.0158 at  $25^\circ C$ .

The index of refraction must, of course, vary even in normal fluids and is usually placed between 1.3330 and 1.3344.

The surface tension is determined by the Traube instrument. There are usually about 52.6 drops to 100 of water.

The spinal pressure as measured by the water or spinal fluid manometer, the patient reclining on his left side, varies normally between 40 and 130 mm. of water. Investigators, while agreeing on the peak of frequency, have considerable latitude for the extremes.

Quineke gives the normal limits as 40 to 130 mm.; Sieard, 43 to 46 mm.; Schultoen, 52 to 100 mm.; Paresot, 100 to 150 mm.; Adamkiewitz, 80 to 160 mm.; Bergmann, 80 to 160 mm.; Cybierski, 72 to 90 mm.; Dryfus, 100 to 200 mm.; Falkenheim, 160 to 200 mm.; Bovari, 170 to 200 mm. It is the experience and opinion of Sorrentino that the peak of normal pressure as determined by lumbar pressure lies between 98 and 138 mm. of water.

When the intraspinal pressure is measured with the patient sitting erect, the reading is higher by 75 mm. or more. The difference between readings with the manometer tube full of spinal fluid and water is negligible. The loss of spinal fluid from the spinal canal necessary to fill the manometer tube is slight and does not appreciably vary the readings. Levison has prepared a tube in which there is no loss, and the Tycho apparatus claims equally accurate readings.

The apparatus usually employed consists of a strong glass tube 50 cm. long, with a one mm. bore or orifice. One end is turned over in a short curve to prevent the entrance of falling matter in the air. Three centimeters from the other end the tube is bent into a right angle. The tube is then graduated from this angle upward in centimeters and millimeters, or a tape so graduated is attached to the tube. A male connection fitting the lumbar needle is attached to the lower end of the manometer tube with a suitable rubber tube. With this simple apparatus the readings are made accurately enough for clinical purposes.

Until the origin of the cerebrospinal fluid and its function and fate are finally decided, it seems futile to go into any great detail on the theories of relation between blood pressure and intraspinal pressure. Certain observations, however, are clinically valuable and some of them are related to various theories and hypotheses of some experimental value. Pfaundler's hypothesis explained the intraspinal pressure so as to divide it into three increments as follows:

1—The hydrostatic increment, increasing and diminishing with the position of the body; erect, reclining, and inverted.

2—The elasticity increment, dependent upon the glandular pressure under which its secretion occurs and its absorption or elimination takes place.

3—The blood pressure increment, which consists of the arterial systolic pressure and the venous jugular pressure.

It is not possible now to consider the glandular pressure, although it is extremely interesting and seems a most important factor in all spinal

pressure investigation. It doubtless depends in some measure upon the arterial pressure and the jugular pressure. At present these factors are clinically important in the study of dementia præcox patients and possibly in their treatment.

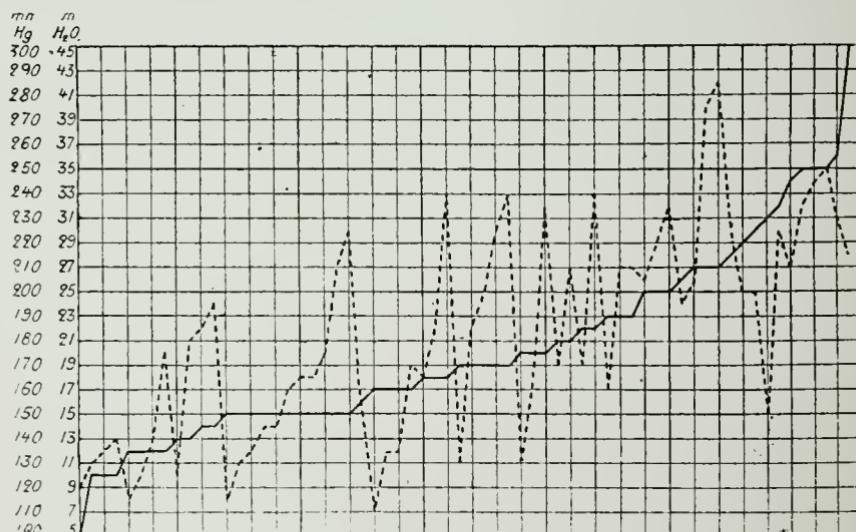
In healthy children Pfaundler gives the relation between the three increments of intraspinal pressure in decimals, as follows:

- (1) Hydrostatic increment: 0.24; (2) secretory increment: 0.08;
- (3) blood pressure increment: 0.68; total, 1.00.

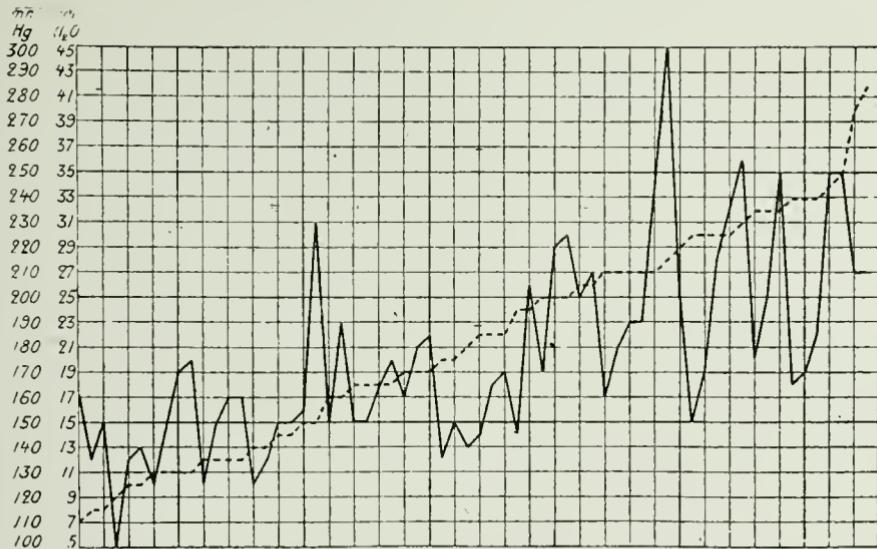
Although in healthy individuals the intraspinal pressure normally varies with the blood pressure, in diseased conditions it is obviously the secretory increment which is most at fault.

It seems remarkable that the clinical observations of intraspinal pressure are so infrequently reported. In a great number of common ailments the intraspinal pressure is much modified and in these diseases the coincident studies of the blood pressure, the serologic condition of the blood and spinal fluid are now recorded as part of routine examination. This furnishes material for comparison that is seldom used.

In nephritis the colloidal condition of the blood serum and the excretions are greatly modified and it is not surprising that the spinal fluid shows abnormal pressure in nearly every stage of the disease, and abnormal physical, chemical, and serological conditions consistent with the pathology of other secretory and excretory glands.



Curve I. The dotted line shows the blood pressure in millimeters of mercury in Lyttken's sixty-four cases of kidney disease and the heavy continuous line shows the intraspinal pressure in millimeters of water at the same time. This table shows the cases arranged in the order of increasing blood pressure.



Curve II. The dotted line shows the blood pressure in millimeters of mercury in Lyttken's sixty-four cases of kidney disease and the heavy dark line shows the coincident lumbar pressure in millimeters of water. Arranged by increasing intraspinal pressure.

Mestrezat, Froment, Caslaigne, Widal, Javal and others base prognosis in nephritis on the chemical and serological condition of the spinal fluid, but Harald Lyttkens has lately collated the spinal pressure findings of sixty-four nephritics in Holmgren's clinic in Stockholm, with the blood pressure in the same patients. The lumbar punctures were made in the horizontal position and the measurements made by the simple Quincke method. The blood pressure was determined by the Riva-Rocci apparatus and auscultation. The results are presented in the two curves below. In Curve I, sixty-four readings on the sixty-four patients are arranged by blood pressure, while in Curve II, the cases are arranged by the lumbar puncture pressure, measured in millimeters of spinal fluid or water. The results of the observations are the same. *The spinal pressure in nephritis increases with the systolic blood pressure.* Lyttken's abstracts are too brief, and therefore too incomplete, to give full significance to these data.

In diabetes mellitus Quincke himself recognized the relation between increased intraspinal pressure and increase of sugar, and the appearance of acetone and acetoacetic acid in the urine. He demonstrated the presence of sugar and acetoacetic acid in the cerebrospinal fluid in coma. Similar observations have been made by Grünberger and Reichmann. Experimentally it has been shown by Weygart that after the intravenous injection of three hundred grammes of glucose in two dogs whose ureters had been ligated, that while the blood and all the other organic liquids showed enormous quantities of sugar the cerebrospinal fluid remained unmodified and free from glucose.

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## HISTORIES OF RECOVERED PATIENTS\*

(Continued)

The treatment of dementia praecox by appendicectomy depends upon the biochemical theory of the etiology of the disease. It is a fact that this theory is not sustained by adequate investigation, but it is thoroughly supported by the results of treatment even under the restricted and unsatisfactory conditions under which this work has been performed.

The theory, to be brief, is as follows: Dementia Praecox as clinically recognized is a symptom complex, due in the main to a toxæmia. The toxin acts upon the brain to produce the lesions recognized at autopsy, and the mental disturbances and ultimate deterioration recognized during life. The toxin is produced in the cecum by the growth of microorganisms (of the colon group) upon the unassimilated portion of the food protein, or upon the excreted waste protein entering the ileocecal valve (especially the histidin) on account of a protracted cecal stasis (or in other cases on account of an incompetency of the liver to destroy imidazol-containing toxines in the portal circulation). The cecal stasis is due to a spasm of the ring of Cannon, which spasm itself may be due to a general spasmophilia from calcium poverty of the blood and lymph or to other undetermined causes.

The destruction of cellular elements in the brain by the intestinal toxin, gives rise to a secondary toxæmia similar to the toxæmia of cerebral concussion (Ceni#) which is especially manifest in the dystrophy of the sex glands, the arrest of spermatogenesis and the atrophy of the testicles and ovaries (Laura Forster, Ceni and Todde). All the other glands of internal secretion are taxed to excrete the products of the primary and secondary intoxication. The cerebrospinal fluid is modified and the intraspinal pressure increased ( $160 = 380$  mm. of water). The fundus of the eye, the ocular muscles and the ocular nervous reactions undergo changes similar to those observed in other intoxications of intestinal origin (George Blin, Tyson and Clark, and Jeal of Omaha). The skin takes part in the effort at excretion of the primary toxines, and the products of their catabolism. The secretions of the skin are excessive and dermographia is conspicuous. The growth of hair is characteristically modified and the odor of the body, to those who have an acute sense of smell, is as pathognomonic as the odor of the smallpox patient is of smallpox. The nails show transverse grooves marking the periods of diminished growth and vitality, synchronous on fingers and toes, and frequently there is an hypertrophy

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# Ceni C. Alienist and Neurologist, Nov. 1917, xxxviii.

of the tongue which causes the teeth to be pressed outward and separated, giving the face a simian expression. The morphology of the blood is much modified and polycythaemia, (5,500,000 or more corpuscles) with a fluctuating leucocytosis is the rule (Kahlmeter, Lundvall and Bruce). The cyanosis which is sometimes so grave as to terminate in gangrene, is partly the result of the polycythemia and partly the result of vasomotor changes in the blood vessels all of toxic origin.

The calcium poverty of the blood, or other cause of spasmophilia and catatonia, have not been demonstrated in this disease though observed in spasmophilia of children.

The spasm of the ring of Cannon has been observed by us in several cases on the fluoroscopy of the advancing barium meal. In resting and chronic cases, this condition has been observed only a few times, but the cecal stasis is present even in other patients.

The cecal stasis is very uniform, the barium meal remaining in the cecum fifty-four hours to three weeks. In a few cases the cecum has been measured to determine its thickness, and to compare it with the thickness of the normal cecum. An apparatus similar to that used by violin makers was used. The cecum is generally thicker than normal.

The defensive ferment reaction of the blood serum is characteristic of destructive processes in the brain, the testicle, the ovary and other glands of internal secretion and of detoxication.

The adrenalin reactions seem to be very generally paradoxical with 0.5 cc. of the 1-1000 solution (P. D. & Co.'s). The blood pressure goes down and, when the same solution is dropped into the conjunctival sac, the pupil expands (Willi Schmidt, Schulz). This reaction is similar to that found in persons who have taken large doses of ergot, or in animals previously injected with histamin, betainimazoleethylamine.

Histamin has been found in the stools of patients with dementia praecox, and the catabolized products of histamin have sometimes been found in the urine, but neither of them have so far been found in the blood.

The colon bacillus capable of catabolic histamin, (*B. aminophilus intestinalis*, *B. & B.*) has been found in the feces of most patients examined, but this organism is also found in the feces of the healthy.

More valuable, however, in supporting this theory than any or all of the fragmentary findings is the remarkable improvement and even recovery of a few patients treated by appendicostomy and protracted irrigation of the cecum and colon with large quantities of water. By this direct and positive method the attempt has been made to arrest the production of toxic amins in the cecum, and diminish the amount of the toxic substances absorbed. Dementia praecox is a progressive disease. While there are distinct clinical remissions, there are few permanent recoveries. It is generally considered a condition hopeless of recovery even with defect.

We have several other conditions in which analogous mental symptoms

appear. One of these is C O poisoning, common now on account of the universal use of the explosive engine. When a person has been subjected to C O poisoning and returned to life, he is generally much changed for months or even years. It is unfortunate that mental tests have not been made on these patients to determine the character of their defects and the course and extent of recovery. The removal of the toxic agent, the CO, does not at once dispel the mental cloud or the mental storm.

In ankylostomiasis symptoms resembling dementia praecox sometimes appear and the successful removal of the worms and the arrest of the progress of the toxæmia slowly restores the patient to relative mental equilibrium and health.

Therefore the simple removal of the toxins from the cecum and colon would not be expected to suddenly and abruptly remove the mental symptoms, but it might be fairly presumed to arrest the destructive processes in the brain substance. When repairs had taken place the defect would be a remnant to be obviated by reconstructive and re-educational methods. In some instances after irrigation the excitement of the intoxication has disappeared rapidly, leaving small defect behind, but in most instances the relatively rational person on recovery showed marked mental defect and loss of judgment,—the picture of a recovered alcoholic. (Korsikov's Psychosis.)

Nor is it to be presumed that the toxin causes a degeneration in the brain alone. The toxin which so punctures the brain cortex with morphologic lesions, affects other organs of the body either directly or indirectly; just how, just where and just how far these lesions go, research alone can determine. But we must presume that a recovered dementia praecox patient has some defects of kidney, liver, spleen and heart muscle due to the primary and to the secondary intoxication.

#### CASES THAT SUBMITTED TO APPENDICOSTOMY BEFORE THE RESEARCH LABORATORY OF THE PSYCHOPATHIC HOSPITAL OF COOK COUNTY HOSPITAL WAS ESTABLISHED

The first dementia praecox patient operated upon, of which any information has come to me, was reported by J. R. Ernst, M. D., of the Peoria State Hospital.\* The date of the operation is given as December 3, 1915, and the patient was in good condition March 27, 1917.

The second patient, Fritche Hough, was a paranoid dementia praecox patient who presented remarkable artistic symptoms. He used alliterating verbiage and drew characteristic dementia praecox drawings. The appendicostomy was performed by me on July 25, 1916, and the boy was faithfully irrigated every night for several months, by his father. He made great improvement and stopped senseless verbiage and drew very excellent

\*Ernst, J. R., Catatonic dementia praecox. Report of a case showing a marked remission following appendicostomy with colonic irrigation. *Dementia Praecox Studies*, January, 1918, I, 27-29.

pictures under the direction of an enthusiastic teacher, who asserted that he manifested a real talent at portraiture.

The third patient was Harold Egan, who was operated by Dr. E. Willis Andrews in September, 1916. He afterwards came into my laboratory and will be considered later.

The fourth patient was Eldon Duggan. He had been at Elgin State Hospital and was paroled in October, 1916, at the request of his parents, for me to operate upon him. Not much more than three weeks after the operation and the beginning of irrigation, he was returned to the Elgin State Hospital and very carefully irrigated there for nearly five months before improvement warranted his return home in March, 1917. He is now well and has been at work in the Tribune Circulating Department. His Draft Board has lately ordered him into productive employment.

The fifth patient operated upon was Mary Bates of Cedar Rapids, Iowa. She was the daughter of a Professor of Chemistry and he determined to have his daughter treated mechanically. She was operated upon in January, 1917, and irrigated by a partially trained nurse for a few weeks, and afterwards by the members of the family. Although she was mute, emaciated, dilapidated and exomatous when treatment began, she rapidly improved and in four months took care of her own evening irrigation of the colon and went into society, drove a car and seemed well. She has continued to improve.

With this meager experience, the Laboratory of the Psychopathic Hospital was opened March 1, 1917, and the patients carefully examined before treatment was begun.

#### NOTES FROM THE HISTORY OF JOSEPH SCHRAW

Joseph Schraw, single, age 20, printer, admitted to the Psychopathic Hospital March 14, 1917, and discharged recovered August 23, 1917.

Family History—Anamnesis obtained from sister of patient, Mrs. Alvord, 2216 North Avenue, Chicago.

Father—Joseph Schraw, Sr., is over 60 years of age, born in United States, sister thinks, but is not sure. He is of German parentage. Informant does not know how many brothers and sisters her father had. He has several sisters in this country, no cases of insanity, nervous trouble, tuberculosis, cancer or alcoholism in the family.

Mother—Catherine Leonard Schraw, born in Wisconsin, has been dead fourteen or fifteen years. Informant does not know age at death. She died of dropsy and heart trouble. She had two sisters and one brother. One sister is living and one brother is living. No insanity or other disease in family, that informant knows of.

Children—Five living, one dead, two boys and three girls. Patient is the oldest boy. All are strong and healthy. No mental trouble noticed. Patient's father has no children by his second wife.

Patient—Is 20 years old, born in 1896 in Wisconsin. He attended

public schools and Catholic schools, quitting when he was sixteen years old. As a child patient was normal according to the informant. He was put in St. Joseph's Orphan Asylum soon after his mother's death, since then he lived with various aunts. He was not hard to care for. He was never very active, always quiet. Since starting to work he has got along well. First thing wrong was when he tried to commit suicide when he got despondent over a girl. He was in the County Psychopathic Hospital for three or four days and was allowed to go with his sister. Since then he worked a short time and was then laid off. Employer stated he would stand and laugh. He was noticed to do this at home. He would stand in



Fig. I. Joseph Schraw before treatment, April 18, 1917.

a clothes closet for hours at a time, and at supper table especially he was noticed to laugh without reason. He grew suspicious about taking medicine and showed negativistic tendencies in refusing to take medicine, going to bed and getting up in the morning. He slept until noon while at home and seemed to lack ambition and energy. He was never talkative and was always quiet. He has never tried to harm himself since the first attempt and is never violent.

Physical Examination—The patient is a medium sized well developed boy of 20 years. He has a peculiarly expressionless face. The nose is small, the upper lip rather large and the jaw weak. He is very slow in all his movements. There is an enlargement of the thyroid gland which is bilateral. Examination of mouth negative, except that his pharynx is inflamed and he says one tooth is bad. The chest is negative to palpation

and percussion. The heart and lungs are negative. Abdomen shows no tenderness, but patient volunteers information that his bowels are not regular. His appetite, however, is good. Patient has no marks of operation and complains of no bodily ailments. The neurological examination is negative. Superficial and deep reflexes are all good. Pupils react well to light and accommodation. Blood pressure 130 mm. mercury. Pulse 80 per minute.

**Mental Examination**—General manner and attitude. The patient is quiet and causes no trouble. He talks in a low voice and seems backward about meeting people. His attitude is one of suspicion, although he consented to let the examiner question him.

**Personal History**—He said he was born in Chicago in 1896. He attended St. Dominiek's Catholic School and reached 7th grade at age of sixteen. He liked school and quit school to go to work because his father wanted him to. He went to work for Jas. S. Kirk & Co., on North Water Street. He stayed there about a year, and started at \$4.00 a week, and later raised to \$5.50 a week. From there he went to work for A. C. McClurg & Co., and got \$6.00 a week filling out duplicates for the salesmen. He stayed there six months. He then went to work for Hardy, the wholesale opticians, and received \$5.00 a week, and was advanced to \$7.00. He worked first at buffing and then later at "roughing out" automobile goggles. The most he received was \$21.50 per week, but this was for overtime work. The most he received for steady work was \$15.00 a week working on a pony press doing commercial printing. He has worked at the printing trade for one year and a half. This was his last job and lost it by being laid off on account of lack of work. It has been three weeks since he has done any work. He said he had been in this hospital once before about the first of the year and stayed there from Monday until Thursday, when his sister took him home.

**Delusions**—Patient denied anyone was his enemy or persecuting him. He was despondent because his friend won his girl away from him, but is not mad at the friend or the girl. He hears no voices talking to him, and does not hear anything unusual. He denied that he stood around at home and laughed, as was claimed. He denied that he hid in a closet for hours at a time, as his folks said. When asked to tell about the girl he said "the girl lived at Stevenses." He seems ill at ease in the surroundings in which he is placed, but makes no attempt to get away or to inquire why he is detained.

**Stream of Thought**—Tell me why you were brought here. My father and aunt brought me here.

Why? They didn't say why. They were going to take me home tomorrow.

But why did they bring you here? What did you do? I didn't do anything.

Do you think they brought you here because you were sick? Well.  
(Patient squirms around and then is silent.)

Do you think you are sick? No, sir.

Now tell me about yourself. There is nothing the matter with me.

Did they think you were sick? I suppose they did.

What did they think was wrong? I don't know what they thought.

Did they think you were insane? No.

Orientation—Do you know what this place is? Yes, sir.

What? Physopethetic Hospital.

You mean Psychopathic Hospital? Yes.

He stated this is the 21st of March (correct). He knows the directions. Says it was 12:45 P. M. (it was 11:20 A. M.). Was a rooming and boarding house.

Patient talks in a low, monotonous voice and it is hard to understand

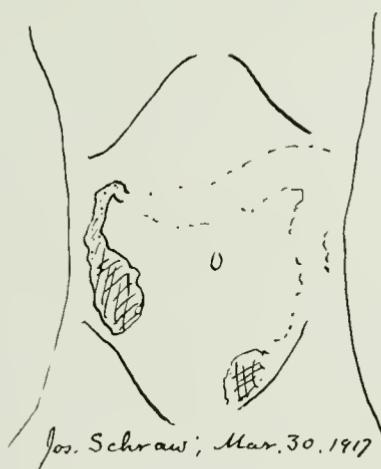


Fig. II. The remnants of the barium meal in the cecum at the 96-hour seance and 90 hours after all the barium had entered the cecum. Case of Jos. Schraw.

him as he does not talk distinctly. He said, "I used to chum around with her." Did you fall in love with her? "I did just for a while." She turned you down for this other fellow? "Sure, she turned me down." What did you do then? "I just went into my own room and stayed there, I didn't bother nobody." When did you try to kill yourself? "I didn't try to kill myself." What did you do? "I didn't do nothing, I tied a neck tie around my neck." That's what a neck tie is for, isn't it? Patient did not smile at this but insisted that he did not want to die. Later, after much questioning, he admitted he tied a necktie around his neck without a collar on, and tied it rather tight. A neighbor's little girl came in his room and found him on the bed with the tie on his neck, and called Mrs. Stevens, who came up and saw him. She called a detective to take him to the hospital. She thought he was trying to commit suicide.

**Summary**—Patient appears retarded, but according to family he has always been of a quiet disposition. He has always appeared normal and

has received fair wages for unskilled laboring work. According to the family, and from what can be gotten out of the patient, he must have been very depressed and tried to end his life, although this he is backward to admit now. The patient is hard to question, as he talks in a low voice and answers questions grudgingly. His personal appearance is careless and he is usually to be found sitting around on the ward doing nothing. It is hard to say whether he is despondent at the present time. No delusions or hallucinations have been made out up to the present time. He may be a case of dementia praecox or a depressed case of manic depressive

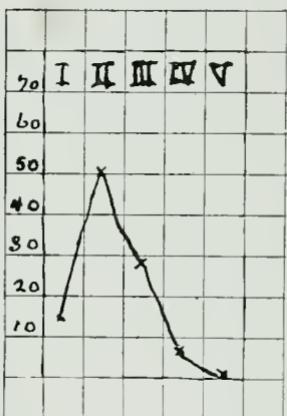


Fig. III. The Arneth Count. Joseph Schraw, April 22, 1917. The curve is the average of 300 leucocytes arranged by nuclear condition.

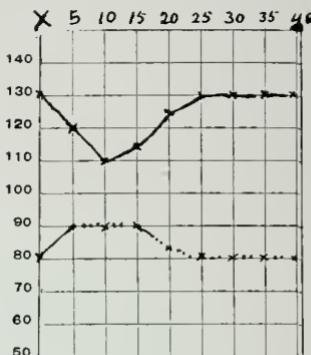


Fig. IV. Adrenalin reaction of Joseph Schraw, April 24, 1917, after the injection of 0.5 cc. Parke Davis & Co.'s 1-1000 solution at x. The blood pressure was read every five minutes for forty minutes and is represented by the full line, the pulse by the dotted line.

insanity, or merely simple depression. He has improved to some degree in that he answers questions better and seems more cheerful. His sister thinks there is a marked improvement.

The X-ray examination of Dr. Blaine shows that there was a certain amount of stasis of the large bowel. This, with his slow speech and retarded motions and actions and mental depression without delusions and hallucinations, make manic depressive insanity most probable.

#### HISTORY WRITTEN BY DR. WALTER A. FORD

When examined by Dr. Ford on April 19, 1917, Joseph Schraw seemed to be in a more depressed mood than he had been at any time since he entered the hospital. He talked in a voice hardly more than a whisper. He was again asked concerning the voices and admitted that he had heard voices speaking to him. He had denied on several other occasions that he heard any voices, but today confessed that voices bothered him both day and night. He said the voices that he hears are the people on the ward talking about him. They say he is "no good" and that he is "going crazy". When he was home his sister and aunt were working against him to get him to come here. They made slighting remarks about him

to annoy him. The fellows on the ward who bother him are hired by the Government to watch him and spy on him. He states, however, that the voices keep him awake at night.

The examination of the abdominal viscera was begun by Dr. Blaine on March 26, 1917, and continued for nearly a month. The stomach was normal and empty of the test barium meal inside the six hours between the first and the second seance. Three days after the test meal was taken there was still a small amount of the meal in the cecum, and sigmoid. The transverse colon was empty.

The Yerkes Bridges Point Scale examination was made by Dr. Herman Campbell Stevens on April 24, 1917. His school grade was 7th, total credits 51, mental age 9 plus, coefficient I. A. 51/88.3. The Rossolemo curve will be found on page 18, vol. I, of these *Studies*.

Several intravenous injections of normal salt solution were given without benefit.

The X-ray examination of Joseph Schraw was finished on March 30th. The bacteriological examination of the stool was begun on March 8th. Plates were made with dilutions of 1 to 1,000,000, on Endo's medium, but this dilution proved to be too concentrated, that is, the colonies were too numerous to count.

On May 14th higher dilutions were used and the count showed about 500,000,000 bacteria per gram of feces, mostly of the colon type. The reaction of the stool was found to be slightly alkaline to phenol-sulphon-phthalein.

On May 23rd, a 1 to 10,000,000 dilution of another sample of stool showed a few colonies of colon bacilli, while the 1 to 100,000,000 dilution gave a pure culture of an organism producing minute white colonies, but which subsequently refused to grow in any media except milk. It could not be grown either aerobically or anaerobically on Endo plates, although first obtained from this medium from the stool. In milk it grew readily, with abundant acid formation. It is probably of the *B. Bulgaricus* group. This sample of stool proved to be slightly acid to phenol-sulphon-phthalein.

On April 16, 1917, blood was taken from Joseph Schraw and the defensive ferment reaction made by Dr. Julius Retinger. Motor speech center, auditory, infundibulum, cerebellum and optic thalamus gave positive reactions, while vision, sensory motor, frontal association, parietal association, sensory, pineal, anterior, pituitary, dura mater, basic nucleus, pons, medulla, spinal cord, parathyroid, thyroid, adrenal, pancreas, testicle, liver and spleen were all negative.

The Wassermann was negative April 18th, and again negative August 22, 1917.

The blood was examined morphologically by James Henderson on April 23, and April 30th. The red corpuscles were high, both counts 5,216,000 and 5,792,000, and the whites, 10,600, 8,850 and 9,750. The differentials were small, monos 23, 23, 32; large monos 4, 7, 4; polynu-

clears 72, 70, 6; eosinophiles 1, 0, 2; basophiles 0, 0, 2 in three counts of 200 each. The nuclear curve is shown in the cut. The haemoglobin index was always high, 90 to 86 (Sahli).

The lumbar puncture was made repeatedly and the spinal pressure found high. On July 26, 1917, it was 370, and on August 21st, 200. The cell count at that time was 7, Nonne, Ross Jones and Wassermann negative.

During the second week in June he was transferred to the County Hospital surgical clinic and appendicostomy was performed by Dr. Lawrence Ryan. He was returned to the Laboratory during the month and irrigation of the colon through the appendix was made every evening four hours after the last meal of the day. Six to ten quarts of warm water was



Fig. V. Joseph Schraw when discharged, August 21, 1917.

found necessary to leave the colon only relatively clean. The small rubber drainage tube was passed into the cecum through the appendix and the percolator full of water, 110° F., was allowed to run in while the patient was sitting on the stool. A manometer was attached to this tube by a three way. After 600 cc. (or even a little more) of the water had run into the cecum at a pressure of only ten or fifteen inches of water, the pressure rapidly rose to about sixty inches and then suddenly gave way with a fall to fifteen inches again. The water rapidly ran in again to half a litre or more and the second rise began. In this way the colon was washed out every evening. I required half an hour for each washing.

He was discharged August 23, 1917, and has been under observation since. He has remained (June, 1918) alert and interested and full of pep.

(To be continued)

# Dementia Praecox Studies

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## OCCUPATION AND DEMENTIA PRÆCOX\*

BY WILLIAM J. NOLAN, A.M.,

Assistant Statistician, New York State Hospital Commission

Among mental diseases dementia praecox is of first importance. In a census of the patients in the New York Civil State hospitals, classified with reference to psychoses, taken July 1, 1916, it was found that of the 35,213 patients then on the books of the hospital, 18,949, or 53.8 per cent were cases of dementia praecox. Many of these had been in the hospitals continuously for over twenty years. The new cases with this disease admitted to such hospitals from October 1, 1909, to July 1, 1916, numbered 7,026, or 17.4 per cent of the total first admissions.

The causes of the disease are obscure but seem to be multiple. In many cases there is a defect in mental make-up, either in the temperamental or intellectual sphere, which prevents the individual from making normal adjustments to his environment. Sometimes the lack of adjustment is seen in aversion to the companionship of others, sometimes in failure in simple undertakings and sometimes in mental breakdown in periods of unusual stress. Habit disorganization as a rule is gradual, and in some cases may be controlled by proper treatment and management.

In the hospital treatment of dementia praecox, effort is made to build up or reeducate the patient so that he may become a useful member of the hospital community. In comparatively few cases can the afflicted person be restored to an independent status. Among the many methods of reeducation the most effectual seems to be systematic instruction in simple, interesting work. Even patients that are utterly apathetic when they enter the hospital are taken to the class room and persuaded to undertake some line of work in which they see others engaged. After much effort and patience they may be taught to do skillful work and an interest in achievement is developed. Thereafter, the work must be kept up and the interest maintained or they will again retrogress.

Having in mind the influence of occupation on the course of dementia praecox, it was thought that a study of the occupations of a large number

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of cases previous to admission might throw some light upon certain factors in the development of the disorder.

The study here undertaken deals with 7,026 dementia praecox patients—3,692 males and 3,334 females—first admissions to the New York Civil State hospitals during the period beginning October 1, 1909, and ending June 30, 1916. The data are taken from the statistical schedule cards of the patients prepared at the hospitals at the time of admission.

The classification of occupations used in the study is the same as that used by the Federal Census Bureau in the thirteenth census report on occupations. The occupations, excepting unskilled labor and clerical occupations, are grouped under the eight general divisions into which the whole industrial field is divided. Certain difficulties were met in classifying the occupations of both men and women. In some cases the data furnished on the schedule were not sufficient to indicate definitely to what general division the occupation or service belongs. This was especially true with respect to unskilled labor and clerical occupations. In many instances it was not stated whether the clerical work was in a store, in an office, or whether it was purely clerical or combined with other work. With respect to unskilled laborers, the branch of industry to which the service belongs was frequently lacking. It therefore became necessary to group the unskilled laborers together, although in the census classification they appear in three of the general divisions of industry.

The study comprises the following topics:

1. The classification of the patients with respect to age, sex and occupation previous to admission.
2. Rate of dementia praecox in certain occupations.
3. Nativity, race and constitutional make-up of the patients previously engaged in certain occupations.
4. Distribution of dementia praecox wives of men in certain occupations.

1a. OCCUPATION AND AGE; MALES

(See Table 1)

As shown by Table 1, the 3,692 male patients were distributed among 13 groups as follows: Agriculture, forestry and animal husbandry 272, or 7.4 per cent; extraction of minerals 6, or 0.2 per cent; manufacturing and mechanical industries 1,336, or 36.2 per cent; transportation 250, or 6.8 per cent; public service 46, or 1.2 per cent; professional service 96, or 2.6 per cent; domestic and personal service 316, or 8.6 per cent; trade 217, or 5.9 per cent; clerical 360, or 9.8 per cent; laborers 584, or 15.8 per cent; students 50, or 1.4 per cent; tramps 8, or 0.2 per cent; no employment and unascertained 151, or 4.1 per cent. These patients were classified according to age at time of admission, as follows: under 21 years of age, 504, or 13.7 per cent; 21 to 44 years, 3,015, or 81.6 per cent; and over 45 years of age, 173, or 4.7 per cent.

The following table gives a comparison of the per cent distribution in the three age groups of the male patients and the general population of the State in 1910 in the principal divisions of industry:

PER CENT DISTRIBUTION OF THE EMPLOYED MALE PATIENTS, AND OF THE EMPLOYED MALE POPULATION OF THE STATE, 14 YEARS OF AGE AND OVER IN THE VARIOUS DIVISIONS OF INDUSTRY.

INDUSTRY	PER CENT OF TOTAL EMPLOYED							
	Total		Under 21 years		21 to 44 years		45 years and over	
	General population	Patients	General population	Patients	General population	Patients	General population	Patients
Agriculture, forestry, etc.....	11.9	7.8	11.1	7.2	9.0	7.3	19.0	17.7
Extraction of minerals.....	0.3	0.2	0.3	....	0.4	0.1	....	1.2
Manufacturing and mechanical industries .....	37.1	38.4	34.2	36.5	38.2	38.6	35.0	38.4
Transportation .....	9.6	7.2	7.0	4.3	10.9	7.7	8.3	5.5
Trade .....	15.3	6.2	14.4	8.2	15.2	5.9	15.9	7.3
Public service.....	2.1	1.3	0.5	....	2.1	1.4	2.9	2.4
Professional service.....	4.1	2.8	1.8	1.2	4.4	3.1	4.4	1.2
Domestic and personal service...	7.0	9.1	4.8	7.4	7.7	9.4	6.4	7.3
Clerical service.....	7.2	10.3	18.9	20.3	6.3	9.4	3.6	1.8
Unskilled labor.....	9.2	16.8	8.7	14.9	9.6	17.0	8.5	17.1

From the above table it is apparent that the age factor is of very little importance. In general the disparity in the distribution of the patients and the general population is similar in each age group. In agriculture and forestry, transportation, trade, public service, and professional service the percentage of male patients is less than that of the general male population, 14 years of age and over; in domestic and personal service, clerical service, manufacturing and mechanical industries and unskilled labor the percentage of male patients is higher than that of the general male population.

#### 1b. OCCUPATION AND AGE; FEMALES (See Table 2)

Table No. 2 shows the occupations previous to admission of the female dementia praecox patients. Of the 3,334 cases, 305, or 9.1 per cent, were under 21 years of age; 2,566, or 77 per cent, were between the ages of 21 and 44; and 463, or 13.9 per cent, were 45 years and over. The distribution among the different general industrial divisions were as follows: Agriculture, forestry and animal husbandry, 127, or 3.8 per cent; manufacturing and mechanical industries 503, or 15.1 per cent; transportation, 14, or 0.4 per cent; trade 64, or 1.9 per cent; professional service 85, or

2.6 per cent; domestic and personal service 966, or 29 per cent; clerical service 132, or 4.0 per cent; students 24, or 0.7 per cent; housewives (other than those in agriculture) 895, or 26.8 per cent. There were 331 to whom no occupation was assigned.

In 1910, 9.1 per cent of the total female population of the State 14 years of age and over were engaged in manufacturing and mechanical industries, 0.4 per cent in transportation, 2.2 per cent in trade, 2.8 per cent in professional service, 9.8 per cent in domestic and personal service, and 4.4 per cent in clerical service. Those engaged in manufacturing and mechanical industries and domestic and personal service in the State comprised only 18.9 per cent of the total female population, 14 years of age and over, while 44.1 per cent of the female first admissions were engaged in occupations in the same divisions of industry. The total number of female patients engaged in gainful occupation was 1,764, of which 503, or 28.5 per cent, were engaged in manufacturing and mechanical industries; 14, or 0.8 per cent, in transportation; 64, or 3.6 per cent, in trade; 85, or 4.8 per cent, in professional service; 966, or 54.8 per cent, in domestic and personal service; and 132, or 7.5 per cent, in clerical service.

A comparison of the per cent distribution of the female dementia praecox first admissions previously engaged in the principal branches of industry, and the females of the State engaged in the same branches is given in the following tabulation:

PER CENT DISTRIBUTION OF EMPLOYED FEMALE PATIENTS AND OF THE EMPLOYED FEMALE POPULATION OF THE STATE, 14 YEARS OF AGE AND OVER, IN THE PRINCIPAL BRANCHES\* OF INDUSTRY.

INDUSTRY	PER CENT OF TOTAL EMPLOYED							
	Total		Under 21 years		21 to 44 years		45 years and over	
	General population	Patients	General population	Patients	General population	Patients	General population	Patients
Manufacturing and mechanical industries .....	30.5	28.5	38.3	38.0	28.2	27.1	24.5	28.7
Trade .....	7.4	3.6	8.5	4.6	7.3	3.5	5.7	1.9
Professional service.....	9.2	4.8	3.4	0.5	12.6	5.1	8.0	6.7
Domestic and personal service....	32.8	54.8	20.7	21.1	34.2	56.0	51.2	59.8
Clerical .....	11.6	7.5	16.9	14.9	11.4	7.2	2.1	2.4

According to the census of 1910, of the female population 14 years of age and over engaged in gainful occupations, 63.3 per cent were em-

\*Percentages in agriculture can not be given as the Federal census does not show the number of farmers' wives and daughters in the State.

ployed in manufacturing and mechanical industries and domestic and personal service; while from the same two branches of industry came 83.3 per cent of the dementia praecox admissions engaged in gainful occupations. It seems evident, therefore, that these two fields are recruiting grounds for dementia praecox.

2a. RATE OF DEMENTIA PRAECOX IN CERTAIN OCCUPATIONS; MALES  
(See Table No. 3)

Table No. 3 shows the rate of dementia praecox per 100,000 of males employed in the various occupations. The average rate for the total number of males for the 6½ years covered by the study was 115. The four groups: manufacturing and mechanical industries, domestic and personal service, clerical service and unskilled labor, were found to have higher rates than the average; and six groups: agriculture, forestry and animal industry, extraction of minerals, transportation, public service, trade, and professional service were found to have lower rates than the average.

RATE OF DEMENTIA PRAECOX AMONG MALES IN THE VARIOUS BRANCHES OF INDUSTRY

	Rate per 100,000 1909-1916
Agriculture, forestry and animal husbandry.....	76
Extraction of minerals.....	58
Manufacturing and mechanical industries.....	120
Transportation .....	85
Public service .....	72
Unskilled labor .....	210
Trade .....	47
Professional service .....	77
Domestic and personal service.....	149
Clerical service .....	166
All industries .....	115

The rate of dementia praecox among males varies widely in the different occupations of each division of industry. In the manufacturing and mechanical industry there is a high rate among bakers, cabinet makers, compositors, jewelers, machinists, shoemakers, tailors and piano tuners; and a low rate among blacksmiths, brick and stone masons, carpenters, plumbers and steamfitters, and tinsmiths. In transportation there is a high rate among street car conductors, sailors and telegraph operators; and a low rate among motormen, longshoremen, and draymen and teamsters. In public service there is a high rate among sailors, soldiers and marines; and a low rate among policemen. In professional service there is a high rate among draftsmen, artists, musicians and music teachers; and a low rate among physicians, lawyers and civil engineers. In domestic and personal service there is a high rate throughout the whole group of occupations. In clerical service there is a low rate among bookkeepers; but a high rate among clerks, messengers, errand and office boys, stenographers and typists.

A comparison of rates in dementia praecox in principal outdoor industries with those in principal indoor industries shows the following:

OUTDOOR INDUSTRIES	Rate per 100,000 1909-1916
Farmers .....	53
Farm laborers .....	92
Brick and stone masons.....	64
Carpenters .....	67
Draymen, teamsters, etc.	44
Policemen .....	50
Laborers (not otherwise specified).....	210

INDOOR INDUSTRIES	
Bakers .....	169
Blacksmiths .....	79
Cabinet makers .....	270
Machinists and millwrights.....	140
Compositors (printers) .....	245
Shoemakers .....	237
Tailors .....	194
Employees in cigar and tobacco factories.....	167
Telegraph operators .....	321
Clerks in stores .....	84
Salesmen .....	71
Teachers .....	99
Elevator tenders .....	412
Draftsmen .....	296
Bartenders .....	71
Barbers .....	116
Bookkeepers .....	89
Clerks, not in stores.....	164
Stenographers and typists.....	335

A high rate of dementia praecox appears in occupations that require close application with accompanying eye strain like those of engravers, jewelers, compositors and machinists.

#### 2b. RATE OF DEMENTIA PRAECOX IN CERTAIN OCCUPATIONS; FEMALES (See Table No. 4)

Table No. 4 shows the rate of dementia praecox among females engaged in certain occupations. As in the case of the males, the rate of dementia praecox among females varies in the different divisions of industry and in the different occupations. The average rate among females in all the occupations was 180 per 100,000, while the average rate among the employed males was only 115.

In the occupations which require continuous attention, long periods of occupation with attendant eye strain, such as dressmaking, lace and embroidery work, shirt, collar and cuff workers, suit, cloak and coat operators, and telegraph operators there is a high rate of dementia praecox. There is also a very high rate among the servant class.

In clerical service the rate of dementia praecox among females is lower than among males.

A comparison of the rates in the two sexes in clerical occupations is given in the following table:

#### RATE OF DEMENTIA PRAECOX IN CLERICAL SERVICE

Occupation	Rate per 100,000	
	Males	Females
Clerical service, total.....	166	116
Bookkeepers .....	89	48
Clerks .....	164	118
Stenographers and typists.....	335	164
All occupations .....	115	180

It is probable that the women who enter clerical service represent relatively a more stable type of personality than is represented by the men in such service—the service being recognized as high grade for women and low grade for men.

A further comparison of rates of dementia praecox in occupations in which both men and women are engaged is given herewith:

#### RATE OF DEMENTIA PRAECOX AMONG MALES AND FEMALES IN CERTAIN OCCUPATIONS

Occupation	Rate per 100,000 employed in the respective occupations	
	Males	Females
Telegraph operators .....	321	246
Clerks (in stores).....	84	84
Salesmen and saleswomen.....	71	107
Actors .....	81	97
Musicians .....	145	130
Teachers .....	99	79
Servants .....	227	427
Waiters and waitresses.....	162	192
All occupations.....	115	180

The exceeding high rate among female servants is noteworthy. Here it would seem that many potential cases are employed and that occupational conditions favor the development of the disease. As the servant class is large the high rate of dementia praecox therein has an important bearing on the general average rate for employed women.

#### 3. NATIVITY, RACE AND CONSTITUTIONAL MAKE-UP OF THE PATIENTS PREVIOUSLY ENGAGED IN CERTAIN OCCUPATIONS

##### NATIVITY (See Tables 5 and 6)

Table No. 5 shows the nativity of the male patients in a group of ten occupations, namely: bakers, cabinet makers, carpenters, clerks, draftsmen, machinists, printers, tailors, painters and teamsters. These occupations were selected because the number of patients represented in them was large and because they were clear cut and without complicating factors.

In the following summary the nativity of the male patients coming from each of the ten occupations is compared:

## PER CENT DISTRIBUTION OF NATIVITY OF MALE PATIENTS FROM CERTAIN OCCUPATIONS

Occupation	Native	Foreign born	Rate of dementia praecox per 100,000
Bakers .....	22.6	77.4	169
Cabinet makers .....	16.7	83.3	270
Carpenters .....	27.0	73.0	67
Clerks .....	79.1	20.9	164
Draftsmen .....	68.7	31.3	296
Machinists .....	56.0	44.0	140
Printers .....	64.3	34.0	245
Tailors .....	10.7	89.3	194
Painters .....	58.6	41.4	117
Teamsters .....	77.8	22.2	44
All occupations .....			115

Of the total male patients, 52 per cent were native and 47.9 per cent foreign born. Comparing the rates of dementia praecox with the per cent distribution by race of the male patients in the several occupations we find no apparent relation between the two.

The total female patients tabulated with respect to nativity were evenly distributed between the native and the foreign born, but the distribution in the several occupations varied widely. This is clearly seen in the following comparisons:

## PER CENT DISTRIBUTION OF NATIVITY OF FEMALE PATIENTS FROM CERTAIN OCCUPATIONS

Occupation	Native	Foreign born	Rate of dementia praecox per 100,000
Bookkeepers .....	81.3	18.7	48
Clerks .....	87.5	12.5	118
Domestics (servants) .....	33.7	66.3	427
Dressmakers .....	54.4	44.8	200
Milliners .....	70.0	30.0	154
Saleswomen .....	76.8	23.2	107
Stenographers .....	82.7	16.0	164
All occupations .....			180

The high rate of dementia praecox among domestics together with the disproportionate number of foreign born patients coming from this occupation is noteworthy. While the distribution of the patients with respect to nativity in the several occupations is very irregular, no correlation between rate of dementia praecox and nativity is discernible.

## RACE

(See Tables 7 and 8)

Table 7 shows the race of the male patients from ten occupations admitted during the years 1913-1916. Previous to 1913 the race of first admissions was not reported.

Of the 329 cases tabulated, 17 were English; 63, German; 76, Hebrew;

50, Irish; 21, Italians; 14, Scandinavian; 15, Slavonic; 23, mixed; and 50 other races or unascertained.

The per cent distribution of these in the ten occupations is summarized herewith:

PER CENT DISTRIBUTION OF RACE OF MALE PATIENTS

While it is apparent that patients of certain races come from certain occupations more than from others, the rate of dementia praecox in these occupations does not seem to be correlated with the race of the patients.

Table 8 shows by occupation the race of a group of 600 female patients admitted in the years 1913 to 1916. Of these, 147, or 24.5 per cent, were Irish; 76, or 12.7 per cent, German; 69, or 11.5 per cent, Hebrew; 59, or 9.8 per cent, Slavonie; and 43, or 7.2 per cent, African. Of the 600 cases, 418 were employed as servants prior to admission. The races most prominent among the patients from this occupation were the Irish, Slavonie, German, and African. The per cent distribution of the cases among the several races and occupations is given herewith:

PER CENT DISTRIBUTION OF RACE OF FEMALE PATIENTS

TABLE 1. OCCUPATION PREVIOUS TO ADMISSION OF MALE  
DEMENTIA PRÆCOX PATIENTS CLASSIFIED WITH  
REFERENCE TO AGE AT TIME OF ADMISSION

OCCUPATION	Dementia Præcox Patients			
	Total	Age Groups		
		Under 21 years	21 to 44 years	45 years and over
Agriculture, forestry and animal husbandry: Total.....	272	30	213	29
Dairymen.....	1		1	.....
Farm laborers.....	151	19	123	9
Farmers.....	94	10	70	14
Gardeners and florists.....	24		18	6
Fishermen and oystermen.....	1		1	.....
Poultrymen .....	1	1	.....	.....
Extraction of minerals: Total.....	6	.....	4	2
Mine operatives.....	5		3	2
Quarry operatives.....	1		1	.....
Manufacturing and mechanical industries: Total.....	1336	152	1121	63
Apprentices (helpers).....	57	21	36	.....
Bakers.....	31	2	26	3
Blacksmiths.....	17		14	3
Boiler makers.....	3		3	.....
Brewers.....	3		3	.....
Brick and stone masons.....	18	1	14	4
Butchers .....	15		15	.....
Cabinet makers.....	18		15	3
Carpenters.....	63	4	58	1
Compositors (printers).....	56	9	46	1
Coopers.....	5		4	1
Electricians and electrical engineers.....	28	3	25	.....
Electrotypes and lithographers.....	9	1	8	.....
Engineers (mechanical).....	4		3	1
Engineers (stationary).....	14		14	.....
Engravers.....	6	1	5	.....
Filers, grinders and polishers.....	14	3	11	.....
Firemen (except locomotive).....	22	1	21	.....
Glassblowers.....	3		3	.....
Jewelers .....	13	1	12	.....
Laborers.....	118	20	94	4
Machinists and millwrights.....	91	7	78	46
Mechanic (n. o. s) *.....	15		10	5
Millers .....	2			2
Moulders, founders and casters.....	16		14	2
Oilers .....	4		4	.....
Painters.....	65	5	54	6
Paperhangars.....	3		3	.....
Patternmakers .....	4	1	3	.....
Plasterers .....	6		6	.....
Plumbers and steamfitters.....	22	1	21	.....
Pressmen (printers).....	7		7	.....
Semi skilled operators:				
Cigar and tobacco factories.....	24	1	22	1
Clay, glass and stone industries.....	11		11	.....
Clothing factories.....	89	18	69	2
Harness and leather industries.....	19	8	15	1
Metal industries.....	31		28	3
Lumber and furniture industries.....	32	7	25	.....
Paper and pulp mills.....	10	1	9	.....
Printing and publishing.....	18	3	15	.....
Shoe factories.....	15		15	.....
Textile industries.....	50	7	38	5
Miscellaneous occupations.....	83	12	70	1
Sewing machine operatives.....	10	2	8	.....

\* (n. o. s.)—Not otherwise specified

TABLE 1.—(Continued) OCCUPATIONS OF MALE DEMENTIA  
PRÆCOX PATIENTS, ETC.

OCCUPATION	Dementia Præcox Patients			
	Total	Age Groups		
		Under 21 years	21 to 44 years	45 years and over
Professional service (continued)				
Teachers.....	10	1	9	.....
Singers.....	3	.....	3	.....
Miscellaneous .....	6	3	2	1
Domestic and personal service: Total...	316	31	273	12
Barbers.....	29	4	23	2
Bartenders.....	14	.....	14	.....
Bootblacks.....	8	1	7	.....
Cleaners.....	9	1	8	.....
Elevator tenders.....	35	10	25	.....
Housekeepers and stewards.....	1	.....	.....	1
Janitors and sextons.....	13	1	9	3
Laborers.....	7	1	6	.....
Launderers (not in laundry).....	1	.....	1	.....
Laundry operatives.....	5	1	4	.....
Laundrymen.....	4	.....	4	.....
Nurses (untrained).....	5	.....	5	.....
Porters.....	56	4	50	2
Saloonkeepers.....	1	.....	1	.....
Servants:				
Butlers.....	8	.....	8	.....
Bellboys.....	3	1	2	.....
Coachmen.....	4	.....	4	.....
Cooks.....	26	.....	25	1
Dishwashers.....	21	3	18	.....
Kitchen helpers.....	12	.....	11	1
Waiters.....	39	1	36	2
Other servants.....	15	3	12	.....
Trade: Total.....	217	34	171	12
Clerks in stores.....	41	11	28	2
Traveling salesmen.....	14	.....	12	2
Decorators.....	2	.....	2	.....
Deliverymen.....	7	3	4	.....
Laborers, porters, helpers.....	9	1	7	1
Proprietors and managers.....	8	.....	2	6
Retail dealers.....	64	13	51	.....
Salesmen.....	67	6	60	1
Wholesaler, importer and exporter.....	2	.....	2	.....
Undertaker.....	2	.....	2	.....
Meatcutter.....	1	.....	1	.....
Clerical: Total.....	360	85	272	3
Agents, canvassers and collectors.....	17	2	15	.....
Bookkeepers and cashiers.....	45	2	41	2
Clerks.....	196	34	162	.....
Messengers, bundle and errand boys.....	71	39	31	1
Stenographers and typists.....	31	8	23	.....
Laborers: (n. o. s.)* Total.....	584	63	494	28
Total engaged in gainful occupations.....	3483	417	2902	164
Students: Total.....	50	32	18	.....
Tramps: Total.....	8	1	7	.....
No employment and unascertained: Total	151	54	88	9
GRAND TOTAL.....	3692	504	3015	173

\* (n. o. s.)—Not otherwise specified.

TABLE 1.—(Continued) OCCUPATIONS OF MALE DEMENTIA PRAECOX PATIENTS, ETC.

OCCUPATION	Dementia Praecox Patients			
	Total	Age Groups		
		Under 21 years	21 to 44 years	45 years and over
Semi-skilled operators (continued)				
Shoemakers and cobblers.....	29	3	24	2
Skilled occupations (n. o. s.)*:				
Piano tuners.....	5		5	
Wood carvers.....	6		6	
Stone cutters.....	3		2	1
Sheet metal, iron and structural iron workers.....	24		24	
Tailors.....	112	14	93	5
Tinsmiths.....	8		8	
Upholsterers.....	5		5	
Transportation: Total.....	250	18	223	9
Water transportation:				
Boatmen and canalmen.....	3		2	1
Captain, masters and pilots.....	1		1	
Longshoremen and stevedores.....	12	1	9	2
Sailors and deckhands.....	87	4	33	
Road and Street:				
Carriage and hackdrivers.....	32		32	
Chauffeurs.....	10	2	8	
Dray, teamsters and expressman.....	27	3	23	1
Hostlers and stablemen.....	7		7	
Railroad transportation:				
Brakemen.....	4		4	
Conductors, street.....	14	2	12	
Employees.....	6		6	
Engineers.....	3		1	2
Firemen.....	4		4	
Guards (subway).....	6		6	
Laborers.....	11		11	
Motormen.....	6		5	1
Switchmen and freight handlers.....	8	2	6	
Express, postal, telegraph and telephone:				
Messengers and railway mail clerks.....	3		3	
Mail carriers.....	10		10	
Linemen.....	4		4	
Telegraph operatives.....	19	1	18	
Telephone operatives.....	6		6	
Miscellaneous laborers.....	17	3	12	2
Public service: Total.....	46		42	4
Guards, watchmen and doorkeepers.....	9		6	3
Laborers.....	6		5	1
Officials and inspectors.....	2		2	
Policemen.....	7		7	
Soldiers, sailors and marines.....	20		20	
Miscellaneous occupations.....	2		2	
Professional service: Total.....	96	5	89	2
Actors.....	4		4	
Architects.....	2		2	
Artists.....	7	1	6	
Authors, editors and reporters.....	3		3	
Civil and mining engineers.....	3		3	
Clergymen.....	2		2	
Dentists.....	4		4	
Draftsmen.....	16		16	
Lawyers.....	6		6	
Musicians and music teachers.....	18		18	
Photographers.....	4		3	1
Physicians.....	3		3	
Showmen.....	5		5	

\* (n. o. s.)—Not otherwise specified.

TABLE 2. OCCUPATION PREVIOUS TO ADMISSION OF FEMALE DEMENTIA PRÆCOX PATIENTS, CLASSIFIED WITH REFERENCE TO AGE AT TIME OF ADMISSION

OCCUPATION	Dementia Præcox Patients			
	Total	Age Groups		
		Under 21 yrs.	21 to 44 years	45 yrs. and over
Agriculture, forestry and animal husbandry: Total.....	127	7	97	23
Farm laborers' wives.....	11	.....	10	1
Farmers' wives.....	56	1	36	19
Florists' and others' wives.....	8	.....	8	.....
Gardeners' wives.....	6	.....	6	.....
Farm laborers' daughters.....	4	1	2	1
Farmers' daughters.....	38	5	31	2
Gardeners' daughters.....	4	.....	4	.....
Manufacturing and mechanical industries: Total.....	503	74	369	60
Dressmakers, seamstresses and embroiderers .....	136	11	103	22
Milliners .....	30	3	24	3
Semi-skilled:				
Button factories.....	6	1	4	1
Candy factories.....	4	3	.....	1
Carpet mills.....	9	3	6	.....
Cigar and tobacco factories.....	16	2	12	2
Corset factories.....	5	1	3	1
Cotton mills.....	4	.....	4	.....
Glove factories.....	12	1	8	3
Knitting mills.....	14	2	10	2
Lace and embroidery makers.....	9	3	6	.....
Paper box factories.....	12	5	7	.....
Printing and publishing.....	17	3	11	3
Shirt, collar and cuff factories.....	28	3	19	6
Shoe factories.....	8	2	5	1
Silk mills.....	9	2	7	.....
Suit, coat and cloak factories.....	13	2	10	1
Woolen and worsted mills.....	5	.....	5	.....
Miscellaneous occupations.....	110	23	76	11
Sewing machine operators.....	47	4	42	1
Tailoresses .....	9	.....	7	2
Transportations: Total.....	14	2	11	1
Telegraph operators.....	3	.....	2	1
Telephone operators.....	10	2	8	.....
Ticket and station agents.....	1	.....	1	.....
Trade: Total.....	64	9	51	4
Clerks in stores.....	14	5	9	.....
Retail dealers.....	3	.....	1	2
Saleswomen (stores).....	43	4	37	2
Demonstrators .....	1	.....	1	.....
Others engaged in trade.....	3	.....	3	.....

TABLE 2. (Continued.)—OCCUPATIONS OF FEMALE DEMENTIA PRAECOX PATIENTS, ETC.

OCCUPATION	Dementia Praecox Patients			
	Total	Age Groups		
		Under 21 yrs.	21 to 44 years	45 yrs. and over
Professional service: Total.....	85	1	70	14
Actors .....	4	.....	4	.....
Artists .....	7	.....	4	3
Trained nurses.....	5	.....	4	1
Musicians and music teachers....	14	.....	10	4
Physicians .....	1	.....	1	.....
Religious and charity workers...	4	.....	3	1
Governesses .....	4	.....	4	.....
Teachers .....	40	1	34	5
Miscellaneous .....	6	.....	6	.....
Domestic and personal service: Total	966	80	761	125
Charwomen and cleaners.....	9	.....	7	2
Housekeepers .....	46	2	38	6
Janitors and sextons.....	3	.....	2	1
Hairdressers and manicurists....	6	.....	6	.....
Laundresses .....	62	2	45	15
Laundry operators.....	4	1	3	.....
Midwives and nurses.....	23	1	21	1
Proprietor of garage.....	1	.....	1	.....
Servants .....	783	72	611	100
Waitresses .....	29	2	27	.....
Clerical: Total.....	132	29	98	5
Agents .....	3	1	1	1
Bookkeepers .....	16	4	11	1
Clerks .....	32	9	23	.....
Stenographers and typists.....	81	15	63	3
Students: Total.....	24	19	5	.....
Housewives, exclusive of those in agriculture: Total.....	895	11	751	133
Daughters, exclusive of those in agriculture: Total.....	182	55	127	.....
Prostitutes: Total.....	11	.....	11	.....
No employment and unascertained:				
Total .....	331	18	215	98
GRAND TOTAL.....	3334	305	2566	463

TABLE 3. RATE OF DEMENTIA PRÆCOX AMONG MALES ENGAGED IN CERTAIN OCCUPATIONS FOR THE PERIOD FROM OCTOBER 1, 1909 TO JUNE 30, 1916

OCCUPATION	Number of Males Engaged		
	In whole State	Dementia præcox patients	Per 100,000 in State
Agriculture, forestry and animal husbandry: Total.....	358,891	272	76
Farmers .....	177,572	94	53
Farm laborers.....	164,612	151	92
Extraction of minerals: Total.....	10,417	6	58
Manufacturing and mechanical industries: Total.....	1,112,011	1336	120
Bakers .....	18,370	31	169
Blacksmiths .....	21,473	17	79
Boiler makers.....	4,964	3	60
Brick and stone masons.....	28,200	18	64
Cabinet makers.....	6,672	18	270
Carpenters .....	93,544	63	67
Compositors (printers).....	22,903	56	245
Electricians and electrical engineers .....	25,195	28	111
Electrotypes and lithographers .....	3,870	9	233
Engineers (mechanical).....	2,573	4	155
Engineers (stationary).....	28,468	14	49
Engravers .....	3,157	6	190
Firemen (except locomotive) .....	13,702	22	161
Jewelers .....	5,003	13	260
Machinists and millwrights.....	65,132	91	140
Moulders, etc.....	13,787	16	116
Painters .....	55,562	65	117
Plumbers and steamfitters.....	30,730	22	72
Shoemakers .....	12,202	29	237
Tailors .....	57,732	112	194
Tinsmiths .....	9,608	8	83
Clgar and tobacco factories.....	14,344	24	167
Piano tuners.....	1,102	5	453
Transportation: Total.....	294,788	250	85
Chauffeur .....	13,150	10	76
Draymen, teamsters, etc.....	60,830	27	44
Conductors (street).....	8,467	14	165
Engineers (locomotive).....	7,559	3	40
Firemen .....	5,224	4	77
Longshoremen .....	18,545	12	65
Motormen .....	9,546	6	63
Sailors and deckhands.....	6,990	37	529
Switchmen .....	8,534	8	94
Telegraph and telephone linemen .....	2,838	4	141
Telegraph operators.....	5,919	19	321

TABLE 3.—(Continued.)—RATE OF DEMENTIA PRAECOX, ETC.

OCCUPATION	Number of Males Engaged		
	In whole State	Dementia praecox patients	Per 100,000 in State
Public service: Total.....	63,827	46	72
Policemen .....	13,973	7	50
Sailors, marines and soldiers..	9,367	20	213
Laborers (n. o. s.) .....	277,517	584	210
Trade: Total.....	460,345	217	47
Clerks in stores.....	48,723	41	84
Traveling salesmen.....	20,086	14	70
Retail dealers.....	168,380	64	38
Salesmen .....	93,924	67	71
Professional service: Total.....	124,007	96	77
Actors .....	4,934	4	81
Architects .....	3,320	2	60
Artists .....	5,044	7	139
Civil and mining engineers.....	7,499	3	40
Clergymen .....	9,691	2	21
Dentists .....	4,685	4	85
Draftsmen .....	5,409	16	296
Lawyers .....	17,138	6	35
Musicians and music teachers.....	12,402	18	145
Physicians .....	14,954	3	20
Teachers .....	10,162	10	99
Domestic and personal service:			
Total .....	211,721	316	149
Barbers .....	24,983	29	116
Bartenders .....	19,732	14	71
Bootblacks .....	3,854	8	208
Elevator tenders.....	8,493	35	412
Janitors and sextons.....	13,703	13	95
Porters .....	15,821	56	354
Servants .....	39,191	89	227
Waiters .....	24,042	39	162
Clerical: Total.....	216,539	360	166
Agents, canvassers, etc.....	11,503	17	148
Bookkeepers .....	50,583	45	89
Clerks, not in stores.....	119,552	196	161
Messenger, errand and office boys .....	24,661	71	288
Stenographers and typists.....	9,240	31	335
Total* .....	3,016,558	3483	115

\*Engaged in gainful occupations.

†Not otherwise specified.

TABLE 4. RATE OF DEMENTIA PRÆCOX AMONG FEMALES ENGAGED IN CERTAIN OCCUPATIONS

OCCUPATION	Number of Females Engaged		
	In whole State	Dementia præcox patients	Per 100,000 in State
Manufacturing and mechanical industries: Total.....	300,075	503	168
Dressmakers and seamstresses	68,077	136	200
Milliners and millinery dealers	19,539	30	154
Button factories.....	1,660	6	361
Cigar and tobacco factories....	11,781	16	136
Glove factories.....	4,608	12	260
Lace and embroidery makers....	2,022	9	445
Paper box factories.....	4,095	12	293
Bookbinderies .....	8,714	17	195
Shirt, collar and cuff factories.	8,112	28	345
Shoe factories.....	5,457	8	147
Suit, cloak and coat factories..	2,687	13	484
Transportation: Total.....	13,916	14	101
Telegraph operators.....	1,219	3	246
Telephone operators.....	12,143	10	83
Trade: Total.....	73,047	64	88
Saleswomen .....	40,231	43	107
Store clerks.....	16,757	14	84
Professional service: Total.....	90,718	85	94
Actors .....	4,138	4	97
Artists .....	2,825	7	248
Trained nurses.....	12,877	5	39
Musicians and music teachers.	10,807	14	130
Physicians .....	1,042	1	96
Religious and charity workers.	1,640	4	244
Teachers .....	50,788	40	79
Domestic and personal service:			
Total .....	322,086	966	300
Charwomen and cleaners.....	6,506	9	138
Servants .....	183,244	783	427
Waitresses .....	15,157	29	192
Clerical: Total.....	114,135	132	116
Bookkeepers .....	33,599	16	48
Clerks (not in stores).....	27,182	32	118
Stenographers and typists.....	49,280	81	164
Total .....	982,434	1764	180

TABLE 5. NATIVITY OF MALE DEMENTIA PRÆCOX PATIENTS ENGAGED IN CERTAIN OCCUPATIONS

NATIVITY	Total	Bakers	Cabinet makers	Carpenters	Clerks*	Drafts-men	Machin-ists	Printers	Tailors	Painters	Draymen teamsters etc.		
											Number	Percent	
United States	351	52.0	7	22.6	3	16.7	17	27.0	153	79.1	11	68.7	51
Austria and Hungary ..	45	6.7	5	16.1	4	22.2	5	7.9	5	2.6	1	6.3	4
Bohemia .....	3	0.5							1	0.5			
Canada .....	5	0.7	1	3.2				2	1.0				
Denmark .....	5	0.7						3	4.8	2			
England .....	9	1.3						3	4.8				
Finland .....	6	0.9						5	7.9	10			
France .....	2	0.3						2	22.2	1			
Germany .....	47	7.0	11	35.5	4			5	1.0	5.1	1	6.3	10
Greece .....	1	0.1						1	1.6				
Ireland .....	12	1.8						1	4.8	1	0.5		
Italy .....	37	5.5	3	9.7	1	5.6	5	7.9	3	1.6			
Roumania .....	7	1.0			1	5.6			1	0.5			
Russia and Poland .....	107	15.9	3	9.7	2	11.1	1	15.9	12	6.1	1	6.2	3
Scotland .....	1	0.1						1	1.6				
Sweden and Norway .....	17	2.5			2	11.1	6	9.5		1	0.5		
Turkey .....	7	1.0						1	1.6				
West Indies..	3	0.5						2	3.2	1	0.5		
Other foreign countries .....	9	1.3	1	3.2	1	5.5	1	1.5	2	1.0			
Inascertain'd	1	0.1										1	1.7
Total.....	675	100.0	31	100.0	18	100.0	63	100.0	196	100.0	16	100.0	56
											91	100.0	56
											112	100.0	65
											100.0	100.0	27
											100.0	100.0	100

Not in stores.

TABLE 6. NATIVITY OF FEMALE DEMENTIA PRÆCOX PATIENTS ENGAGED IN CERTAIN OCCUPATIONS

NATIVITY	Total	Book-keepers	Clerks	Domestics*	Dress-makers	Milliners	Sales-women	Stenographers
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States.....	377	49.9	13	81.3	28	87.5	141	33.7
Austria, Hungary and Bohemia .....	90	11.9	1	6.3	1	3.1	81	19.4
Canada .....	5	0.7					3	2.2
England .....	4	0.5					1	0.7
Finland .....	14	1.8					14	3.3
France .....	7	0.9					6	1.4
Germany .....	42	5.6					34	8.1
Ireland .....	89	11.8	1	6.2			71	17.0
Italy .....	14	1.9					8	1.9
Russia and Poland.....	64	8.5	1	6.2	2	6.3	26	6.2
Scotland .....	6	0.8					4	1.0
Sweden and Norway .....	19	2.6					14	3.3
West Indies.....	9	1.2					7	1.7
Other foreign countries .....	14	1.8					9	2.2
Unascertained .....	2	0.2					1	0.8
Total.....	756	100.0	16	100.0	32	100.0	418	100.0
							136	100.0
							30	100.0
							43	100.0
							81	100.0

\*1913-1916.

TABLE 7. RACE OF MALE DEMENTIA PRAECOX PATIENTS\* ENGAGED IN CERTAIN OCCUPATIONS

RACE	Total	Bakers	Cabinet makers	Carpenters	Clerks	Draftsmen	Machinists	Printers	Painters	Tailors	Teamsters
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number
African . . . . .	7	2.1	1	4.2	2	6.5	1	1.2	-	-	3
English . . . . .	17	5.2	2	16.7	2	6.5	6	7.2	2	8.0	18.8
Finnish . . . . .	3	0.9	2	16.7	7	22.6	12	14.5	2	2.3	1
German . . . . .	63	19.1	12	50.0	2	16.7	7	24.1	2	2.3	6.3
Hebrew . . . . .	76	23.1	1	4.2	1	8.3	6	19.3	20	16.0	2
Irish . . . . .	50	15.2	1	4.2	5	16.1	22	26.5	2	13.3	12.5
Italian . . . . .	21	6.4	2	8.3	1	8.3	1	3.2	2	4.0	31.2
Magyar . . . . .	5	1.5	1	4.2	2	16.7	1	2.4	4	1.0	6
Scandinavian	14	4.3	1	8.3	4	12.9	3	3.6	1	2.0	2.3
Slavonic . . . . .	15	4.6	4	16.7	1	8.3	2	6.5	6	11.8	12.5
Mixed . . . . .	23	7.0	1	4.1	1	3.2	4	4.8	5	38.5	3
Other specified races	5	1.5	-	-	-	-	-	-	-	-	18.7
Unascertained . . . . .	30	9.1	1	4.1	2	16.7	1	3.2	13	15.7	2
Total . . . . .	329	100.0	24	100.0	12	100.0	31	100.0	83	100.0	25
											100.0
											44
											100.0
											16
											100.0

\*Includes first admissions of 1913-1916 only.

TABLE 8. RACE OF FEMALE DEMENTIA PRÆCOX PATIENTS\* ENGAGED IN CERTAIN OCCUPATIONS

RACE	Total	Book-keepers	Clerks	Dress-makers	Milliners	Sales-women	Servants	Stenographers
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
African .....	43	7.2						
English .....	17	2.8						
Finnish .....	16	2.7						
French .....	10	1.7	1	5.0	1	1.3	41	9.8
German .....	76	12.7						
Hebrew .....	69	11.5	4	44.4	2	10.0	13	3.1
Irish .....	147	24.5	5	55.6	7	35.0	16	3.8
Italian .....	15	2.5						
Magyar .....	22	3.7						
Scandinavian .....	19	3.1						
Scotish .....	6	1.0						
Slavonic .....	59	9.8						
Mixed .....	24	4.0						
Other specified races .....	17	2.8						
Unascertained .....	60	10.0						
Total.....	600	100.0	9	100.0	20	100.0	15	100.0
							418	100.0
								41
								100.0

\*Includes first admissions of 1913-1916 only.

These data do not seem to indicate that the high frequency of dementia praecox in any occupation was due to race. Previous studies of admissions to the New York State hospitals with respect to race seem to indicate that the rate of dementia praecox among the Slavs and Hebrews is somewhat higher than among other races, but as no general census of race exists the matter can not be positively determined.

## CONSTITUTIONAL MAKE-UP

As constitutional make-up is deemed a factor in the development of dementia praecox the following tables were prepared to show the extent to which abnormal make-up appeared among the patients coming from some of the principal occupations:

## CONSTITUTIONAL MAKE-UP OF MALE DEMENTIA PRAECOX PATIENTS ENGAGED IN CERTAIN OCCUPATIONS

**CONSTITUTIONAL MAKE-UP OF FEMALE DEMENTIA PRAECOX PATIENTS ENGAGED IN CERTAIN OCCUPATIONS**

OCCUPATION	Total		Normal		Abnormal		Unascertained		Rate of dementia praecox per 100,000
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Bookkeepers .....	16	100	9	56.3	7	43.7	....	....	48
Clerks .....	32	100	23	71.9	9	25.0	1	3.1	118
Dressmakers .....	136	100	80	59.2	44	32.1	12	8.7	200
Milliners .....	30	100	20	66.7	9	30.0	1	3.3	154
Musicians and music teachers .....	14	100	9	64.3	4	28.6	1	7.1	130
Saleswomen .....	43	100	21	48.9	21	48.8	1	2.3	107
Servants .....	783	100	381	48.7	247	31.6	155	19.7	427
Shirt, collar and cuff makers .....	28	100	13	46.5	9	32.1	6	21.4	345
Stenographers and typists .....	81	100	57	70.4	24	29.6	....	....	164
Teachers .....	40	100	32	80.0	6	15.0	2	5.0	79
Waitresses .....	29	100	13	44.8	15	48.8	1	3.4	192
All occupations.....	....	....	....	....	....	....	....	....	180

Considerable variation appears in the percentage of abnormality in the several groups of patients, but there seems to be no correlation between the percentages of make-up and the rates of dementia praecox.

**4. DISTRIBUTION OF DEMENTIA PRAECOX AMONG WIVES OF MEN ENGAGED IN CERTAIN OCCUPATIONS**

The 976 patients who were reported as wives are classified in the following table according to the occupation of the husband. It will be noted that the cases are widely distributed among the occupations. As the general census gives no data concerning the number of wives of men engaged in the several occupations in the State, the rate of dementia praecox in the different groups can not be computed. In the tabulation many of the minor occupations are omitted.

## DISTRIBUTION OF DEMENTIA PRAECOX WIVES OF MEN ENGAGED IN CERTAIN OCCUPATIONS

OCCUPATIONS	Wives of men in occupations	OCCUPATIONS	Wives of men in occupations
Agriculture and animal husbandry, total	81	Trade, total	82
Farmers	57	Real estate dealers	5
Farm laborers	11	Retail dealers	40
Manufacturing and mechanical industries, total	350	Salesmen	16
Bakers	16	Traveling salesmen	5
Blacksmiths	3	Professional service, total	31
Boiler makers	3	Actors	1
Brick and stone masons	7	Architects	1
Cabinet makers	6	Chemists	2
Carpenters	33	Civil engineers	1
Cigar makers	4	Clergymen	1
Compositors (printers)	12	Dentists	2
Electricians and electrical engineers	8	Designers	1
Engineers (stationary)	6	Draftsmen	1
Jewelers	6	Editors and reporters	2
Machinists	25	Lawyers	1
Moulders	6	Musicians	2
Painters	30	Photographers	2
Paperhangers	4	Physicians and surgeons	4
Plasterers	3	Teachers	4
Plumbers	8	Domestic and personal service, total	104
Shoemakers	8	Barbers	10
Tailors	27	Bartenders	10
Tinsmiths	4	Elevators	3
Upholsterers	5	Janitors and sextons	9
Transportation, total	126	Porters	19
Longshoremen	3	Restaurant keepers	4
Brakemen (railroad)	4	Saloon keepers	6
Conductors (railroad)	4	Servants	14
Conductors (street)	6	Waiters	19
Engineers (railroad)	5	Clerical service, total	52
Firemen	3	Agents	5
Motormen	9	Bookkeepers	12
Chauffeurs	11	Clerks	26
Stablemen	3	*Laborers	101
Teamsters	14	Unascertained	25
Telegraphers	3	Total	976
Public service, total	24		
Policemen	9		

\*Not otherwise specified.

## CONCLUSIONS.

1. Dementia praecox patients come from all branches of industry.
2. In agriculture and forestry, transportation, trade, public and professional service the percentage of male patients is less than that of the general male population 14 years of age and over; in manufacturing and mechanical industries, domestic and personal service, clerical service and unskilled labor the percentage of male patients is higher than that of the general male population.
3. A disproportionate number of female patients come from domestic and personal service.
4. The age factor is not of great importance in determining the distribution of the patients among the various branches of industry.
5. The rate of dementia praecox varies widely in the different occupations of each division of industry.
6. A high rate of dementia praecox appears in occupations that require close application with accompanying eyestrain.

7. The average rate of dementia praecox is higher among employed women than among employed men.

8. In clerical service the rate of dementia praecox is higher among men than among women.

9. The nativity, race and constitutional make-up of the patients studied do not show that these factors are correlated with the rate of dementia praecox in the several occupations.

10. The rate of dementia praecox is greatly modified by both the character of the occupation and the mental and physical make-up of those entering the occupation.

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### THE TRADITIONAL ETIOLOGY OF INSANITY

"What virtue and stoicism does not the friar need to possess! Let those who criticise them on this point imagine themselves to be living in a village without relatives and friends or any other fellow countrymen; at least, with whom they can converse, and then let them be candid. Don Inigo Azaola told me that meditating on the reason why so many Spanish religious went mad, he thought that it had its origin in the continual struggle between nature and devotion."—Character and influence of the Friars (in the Philippine Islands), Simbaldo de Mas, 1637, Blair and Robertson, xxviii, p. 244.

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"A parrot lives 125 years; an elephant lives 400 years; a whale lives 200 years; a tortoise lives 100 years; a swan lives 25 years; a horse lives 25 years; an ox lives 20 years; a camel lives 20 years; a lion lives 20 years; a cat lives 15 years."—Humane Pleader.

A dementia praecox patient lives fourteen years and eleven months after commitment in the State hospitals of New York. He costs the State \$200.00 a year, and his family twice as much in cash and ten times as much in loss of efficiency, pep and the joy of life. Dementia praecox patients cost the State of New York not less than \$3,788,000.00 for custody alone, and there are enough patients in the eighteen State hospitals with this disease alone to pile up a liability against the State of more than \$57,000,000.00. The Psychiatric Institute on Wards Island has an appropriation of \$25,000.00 a year!

## EMPLOYMENT AND RE-EDUCATION OF DEMENTIA PRÆCOX PATIENTS

By BAYARD HOLMES

The pitiable condition of the young insane would be promptly relieved if the picture of their neglect and suffering could be brought in an efficient manner before the public. Statistics are inert or certainly not dynamic. To say that 130,000 dementia præcox patients are deteriorating in our institutions in inactivity and reverie means nothing to the average man or woman. It's too far away from them. The question which comes to me now is this: Can the personalized experience of these unhappy youths be carried to the public consciousness and there be changed into emotionalized activity? Can it be shown to our women's clubs, to our church gatherings, to the meetings of our labor organizations, in such a manner as to revolutionize the whole system of institutional custody?

Our deepest interest is in research and in the elevation of the State Hospitals to a strictly curative basis. This can only be done by a removal of the custodial function to colonies and workshops. Until such a Utopian change is accomplished we must make the most of our present opportunities.

The question of re-education and employment presents itself in two distinct horizons. In the first instance the employment is productive. At the present time three thousand patients are cared for by the state on a few hundred acres of land with the paid services of less than three hundred sane persons. The balance of the work is done by the chronic insane themselves. This is a decided economic advantage to the state. Nowhere, so far as I know, does any state compensate its hard-working insane, the most of whom are dementia præcox patients in a resting stage.

In the second instance the employment is therapeutic and re-educational. Such employment requires skilled teachers, and it is not remunerative to the state, at least for a considerable time. After a while the insane person becomes more or less independent and can be removed from the therapeutic group to the remunerative group of workers.

At the meeting of Alienists and Neurologists in Chicago early in July, 1917, a half day was devoted to the recital of the experiences of the teachers in the various State Hospitals. It was a symposium, the spirit of which could not be paralleled outside of a religious revival. Beginning with libraries and reading classes, the recital went on through every form of therapeutic employment to the very verge of remunerative tradesmanship and inspiring art and music. Most of the teachers were women and the major part of their remuneration was manifest in their faces, their manners, and their inspiration. The reading of the proceedings of that meeting gives but a very imperfect sketch of the enthusiasm and promise which those papers held forth.

It would be well to call attention to two remarkable examples, the one at Yankton, South Dakota, in productive employment of patients; the

other at Jacksonville, Ill., in the development of a dementia praecox school.

Some twenty-eight years ago, Dr. Leonard Mead, a graduate of Rush Medical College and a man brought up on the farm with the experiences of a farm boy in a pioneer country, became superintendent of the recently established hospital for the insane at Yankton, South Dakota. He found one large Kirkbride building already erected and a dining hall and service building in process of construction. The Legislature had appropriated \$60,000 for the new structure. The plans had been drawn and the estimates made before the appropriation was received and any of the contracts let. Before this building was half completed it was obvious that the appropriation was too small or the contractors had connived to rob the state. With the approval of the governor and the board of trustees, and without any special experience, Dr. Mead cancelled the contracts and undertook the work himself, with directly employed and patient labor. He was a discerning man and had a mathematical and mechanical though unfortunately not an artistic talent. The building was completed within the appropriation and Dr. Mead became firmly attached to three or four skilled workmen whom he had found on the job when he took it over from the contractors.

This was just the time when the use of concrete in building came into prominence. With unusual discernment and by the intuition of common sense, combined with mathematical skill, each of the new buildings required for the constantly increasing insane were constructed. He used the then novel re-enforced concrete and he employed neither architects nor common workmen, but drew his own plans, and with the assistance of three or four skilled workmen and a great number of his dementia praecox and other patients he has built up an institution which could not be replaced for \$3,000,000, at an expenditure of less than \$1,000,000.

If one visits this institution he will find no inflammable structures. There is no wood used anywhere except in window casings, doors, and door frames. The floors are mosaic or terrazzo and there are no wooden mop-boards; hence no possibility of bugs or cockroaches. The plumbing is most permanent and substantial, regardless of expense, and the toilets are separated by terrazzo slabs and partitions. The walls are of a hard finish on hollow concrete blocks, and the roofs are all concrete tile or concrete roofs protected by asphaltum spaces.

In some of the hallways the most beautiful terrazzo or marble stairways have been constructed supported by reinforced concrete beams, in one place twenty-eight feet long.

From the outside the buildings are rather ugly and hardly one of them is completely finished. As soon as one building was enclosed and occupied it became necessary to build another. The interiors of these buildings, however, are remarkable adaptations to their purposes. In one particular structure for women, the "U-shaped" building two stories high is a model.

It has been in use more than ten years and there is not a crack in the walls nor the evidence of a leak in the roof.

At a recent visit a new building was under construction. It was one of the most substantially built structures I have ever seen. It could be used for a warehouse for any sort of material. The spans were excessive for reinforced concrete, but they were each mathematically designed to bear a load far beyond any possibility they could ever suffer.

The men at work were all patients except half a dozen. These were the permanent building staff of the hospital. There was no hurry in construction and hence there was abundant time for the cement to set before the frames were removed.

In the whole institution there was not found a single ward with the revolting spectacle which we see so often in the terminal wards devoted to dementia praecox. This is not due alone to the humane attendants and the careful supervision, but it is due largely to the fact that there is always something for every patient to do in the building operations and the farm work of this very commendable State Hospital.

In quite a different spirit was the school at the Jacksonville State Hospital organized by a young medical man some six or eight years ago. This school followed rather than imitated the work of Lamoure at Utica.

When I first heard Dr. Edward Franklin Leonard give an account of his experiment at Jacksonville it seemed too good to be true. His recital published later is so naive and is told with such evident enjoyment that I regret it cannot be reproduced in full.

"We have met the badly-trained, spoilt child, who does everything with an air of suspicion and hostility; whose parents seemed to have had always in mind the idea of checking and suppression. As the writer noted the unruliness, the lack of restraint, and the utter indifference to the result of their action which the dementia praecox patients exhibited, he felt they were but children. In fact, the history of many of these patients shows that they were the pampered, coddled, spoilt children of the family.

"In the acute stage of the disease, patients are very rebellious toward authority, as well as adverse to receiving advice; they are also skeptical, ungrateful, egotistical and cynical. They seem to live in a world of their own, and are apparently content in their isolation. When the acute stage has passed they become less impulsive and take more readily to suggestion and discipline.

"Those under the writer's care had passed the acute stage, and he felt a desire to make at least an effort to arouse their dormant faculties. If one were endeavoring to overcome bad training in a child, the first thing would be to remove their feeling of restraint and hostility, allowing them freedom of action as far as compatible with proper discipline. The writer could see no reason why the same course would not be effective with dementia praecox patients.

"One man of the catatonic type held the writer's attention at first. He was unusually obstinate and resistant to restraint and discipline, and in his rebelliousness and obstinacy refused to conform to the hospital rules, thus exacting almost individual attention from the attendants. All efforts to draw him into conversation or arouse his interest failed at first. Patience was rewarded one day, however, when he was discovered reading an article in a magazine the writer had left with him the previous day. This seemed to be the entering

wedge; for it awakened a desire for more reading, and before many days he was drawn into a discussion of something he had read. From that time on this patient was encouraged and led, much as one would a backward child.

"For a long time he made no further advancement; then one day he gathered two or three patients around him, and read aloud an article to them. Fearful of driving him back into his shell, the writer made no comment on the reading circle, and it slowly grew to larger proportions. Even this slight mental occupation caused a noticeable improvement in the patient; for he became more amenable to the rules of the ward, and began to take an interest in his surroundings.

"The evident pleasure the reading circle afforded this patient was what gave the writer the idea of placing him in charge of a systematized work among other patients. This plan was suggested to him very subtly, at first, and though it was not received enthusiastically, neither was it repulsed. Later he agreed to try the plan.

"When the promise to start a school in his ward was secured, we still had a difficult task confronting us—that of getting together enough interested patients to form a school, for it is difficult for a dementia praecox to mix with other patients or hold a sustained interest in anything. Again we used the tactics one would use with a timid child. The patients were not over-urged or threatened into the work, but they could not help seeing that something unusual was taking place in the ward. Thus, first their curiosity, then their interest was aroused, and before long a school was in systematic, working order. The bell was rung promptly at eleven in the morning, and the school hour lasted until the whistle blew at noon, and the afternoon session was from two until three.

"It may be because of the fact that dementia praecox patients respond more readily to a regime treatment than to one of drugs, that those attending the school adapted themselves to the routine of the work, and subordinated themselves to the now thoroughly aroused stronger will power of the teacher-patient. Of course, the educational treatment had to be started on a plane suitable to the intelligence of the patients attending. At first their attention was attracted by the reading of very simple, profusely illustrated stories; gradually easy spelling and mathematical problems were added—lessons that would be play for a normal child—but applied in their simplicity to these patients because of the fear that harder tasks might drive them away.

"To attain even this small beginning was a slow process, and for months little progress seemed to be made. The work continued, however, and, at the suggestion of the teacher, history, geography and writing were added to the school curriculum. Soon there began to be an air of alertness and interest in surroundings among patients; they were easier to control, and began to look forward eagerly to school time, some of them arranging chairs and taking their places before the bell rang.

"It was, however, no easy task to teach these patients, for with some of them it required great patience to arouse even a slight interest; others needed a stronger sense-stimulus, and still others repeated sense-stimulus to awaken perception. But contact with the insane soon reveals the fact that even the most chronic will respond to some sense-stimulation, for no matter how demented a patient is he learns to respond to the bell for meals, find his place at the table, remain standing until he receives orders to sit down, and return after the meal to his own special corner in the ward. It is also true that some of the untidy patients can be trained to respond to the calls of nature.

"Facts such as these seem to emphasize the feasibility of re-education as a factor in the treatment of dementia praecox. *The writer feels that the idea of*

*incurability in connection with this class of patients has grown too prevalent.* That their physical wants are well taken care of is not to be denied, but the essential thing—the restoration and conservation of their latent mentality—is overlooked. This, however, is not the fault of our state hospitals. The attendants have too little education to undertake the re-education of patients; while the staff physicians have so many patients under their care that they have very little time for an intelligent study of individual cases.

"During the writer's service in the hospital he was much impressed by the fact that the patients who work on detail (as on the farm, in the dining room, the kitchen, etc.) or those who have regular duties to perform, are the least troublesome, and make the most rapid strides toward recovery. The realization of this caused the writer to go on with his plan of re-education after a two-year trial.

"By this time there was a great improvement among the former sullen, defiant patients, and in the teacher-patient the change was almost unbelievable. He was, in addition to having full charge of the school, making money enough to clothe himself, as well as buy a few luxuries, by selling cigars and chewing gum and doing odd jobs for the attendants. He was thoroughly interested in the school work, and was adding new features to it from time to time, such as a monthly spell-down and a singing class. *Later this singing class was given a separate hour between supper and bedtime, as certain patients would join in the singing who could not be induced to attend the school.* At this time it was made a rule that those attending classes should be neat and clean, and it was not long until there was a friendly spirit of rivalry as to who made the neatest appearance.

"A short time after the starting of the singing class, a Sunday school was organized in the ward, the untiring teacher filling the triple position of superintendent, teacher and preacher. And in the summer of that year a regular course in physical culture was introduced, races and contests being added later. While in the fourth year, the last, but not least, interesting work was undertaken. This was the organization of a secret society among the student patients. The initiation fee of this society was the attainment of certain marks in school. So great was the interest taken in this society that few of the pupils failed to attain the required mark.

"This school was carried on for five years. In that time the ward changed from a moderately violent one to one of the best in the hospital; a fact which brought forth words of commendation from relatives and friends of the patients. *Many of those attending the classes showed such improvement that they were allowed to go home, and the teacher-patient was discharged as cured, and has been earning a good living for his family for several years.*

"Taking into consideration the success of this school as well as the large percentage of dementia praecox in our state hospitals, it seems only fair that they should receive their chance, rather than be allowed to grow more demented through thoughtless neglect.

"Special teachers, well-versed in child-training, should be employed if the re-education treatment is undertaken, for it is necessary to reward, commend and rekindle the spirit of emulation in these patients, as one would in a child. A teacher will often have to resort to using building blocks, showing pictures and teaching the making of paper chains and toys, as is done in kindergarten. Later their interest might be aroused by setting them to tasks having a similarity to the work they did before entering the hospital.

"If deterioration can be arrested in a dementia praecox by proper training, should not an effort be made in that direction, even though such treatment may not make normal citizens of these patients? A physician who has successfully carried a patient through a serious illness does not expect him to return immediately to the tasks he had been able to accomplish before that illness. He advises him to

resume such work slowly, or undertake lighter tasks. Why then should we expect one who has been mentally sick for years to return to his old place in the world unless he can be under sympathetic care and guidance?"

It seemed to me that the state administration should provide for productive employment and should institute schools for re-education and development for both male and female patients, especially those suffering of dementia praecox.

The matter ought to be placed under the direction of a commission selected from the normal schools and the university as of great pedagogic and psychological importance. We can provide model training schools for groups of students in pedagogy from the university with a remarkable field for research and experience. Any system of education ought to include music for the development of the voice, reading, reciting, and dramatics for the discovery of interest and activity, and skillful gymnastics to promote health and physical growth. The use of tools must necessarily be somewhat limited, but by proper classification of patients, sloyd and manual training could be utilized where outdoor work is precluded.

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### INTELLIGENCE TESTS

The possibility of preparing a condensed set of crucial, dependable and workable "reconnaissance tests" for the detection of the so-called latent cases of mental defectiveness which would lead to their recognition with sufficient assurance when they could be turned over to the psychopathologist, which could be added to the armamentarium of the recruiting surgeon, school teachers, social workers, etc., was taken up by us in co-operation with the senior medical officer of one of the Illinois National Guard units. The applicability of visual memory tests along the lines developed in the laboratory in this respect has also been referred to in an article on pfective schizophrenia and dementia praecox in relation to crime. Such a problem presents many difficulties. The outspoken cases of intelligence and affective defect are easily recognized by the layman, the former more easily than the latter, and present little difficulty, but the higher and lighter grades of defect, respectively, while relatively, in most instances, potentially much more dangerous, yet are not so readily detected or evaluated as such by the inexperienced.

HICKSON.

MACROGLOSSIA AND THE SIMIAN PROTRUSION AND SEPARATION OF THE TEETH IN THE COURSE OF  
DEMENTIA PRÆCOX

BY BAYARD HOLMES, M. D.

The deterioration of our insane adolescents is often suggested by the deformities of the face and senescence of attitude. It is not possible to mention more than one of them in connection with our present patient, William Feldmeth. He is a well educated and regular featured young man whose photographs of a few years ago exhibit a countenance of real comeliness. Now the teeth are separated from one another and the incisors on both jaws everted and thrust forward. The tongue is greatly enlarged. The molars and premolars have produced deep indentations on the side



Fig. 1. The tongue of William Feldmeth. Macroglossia of dementia præcox. The patient's tongue showed the imprint of the teeth and the condition had been so excessive and so long lasting that the teeth themselves were tipped outward simian like. Compare cut of skull in Butlin and Spencer's monograph.

of the tongue. Even when the mouth is open and the tongue protruded the greatly enlarged and thickened tongue seems to fill the roof of the mouth. There is an even, thick feeling to the tongue with no enlarged glands, no tenderness, and no abnormality of the mucosa which could account for the condition.

This thickening of the tongue and protrusion of the teeth is observable in a large proportion of dementia præcox patients, and gives them

the unattractive, if not repulsive, appearance they often present. It is not always an early symptom. Fig. 1.

Macroglossia is a common symptom of finding in mongolian and cretin idiots. It also appears in certain syphileties. Its various forms and the histologic conditions found in each have been described by Butlin and Spencer and by a great number of histologists (v. Cat. Surg. Gen. Library, under heading, tongue). So far as my own study of the literature has gone no one has called attention to this condition as a symptom of dementia praecox.

In many infectious diseases macroglossia or temporary enlargement of the tongue is common enough. It is well recognized by dentists as a cause of prognathism and separation of the teeth. It seems but natural that the toxemia of dementia praecox should produce enlargement of the tongue and the simian face, especially in emaciation, which was looked upon by our psychiatric ancestors as a stigma of mental disease. The very fact that the simian prognathism is a traditional stigma of mental deterioration speaks for the possible frequency of macroglossia.

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It is our conviction that in the greater part of the practical work of mental examining which has been done during the past ten years, far too little attention has been paid to the problem of comparability. We propose so to standardize our point-scale method that the mental ability of a subject may be expressed in its relation to the group in which he belongs; and the relation of that, in turn, to other increasingly dissimilar groups should be available for the use of the examiner. The groups in question may be restricted as closely as need demands. It is, for example, not adequate for us in the school system of the American city to treat all individuals as though born to the English language. Indeed, it may ultimately become clear that, while applying the same scale to individuals of every race, we should evaluate our results always in the light of definitely established racial norms.

It has not seemed feasible to discuss in this brief paper the work of other students of social and economic status. We have not overlooked the fact that there is an important, although extremely unsatisfactory, body of literature on the subject.

YERKES AND ANDERSON.

## NEW YORK COMMISSION

In the State Hospital Quarterly (New York) for May, 1918, the appropriations for 1918-1919 are published on p. 286.

The office of the commission is allowed \$189,843.00. This office includes the Psychiatric Institute on Ward's Island for which \$27,888.00 is allowed, and the Bureau of Deportation with \$14,100.00.

For the thirteen State Hospitals \$11,430,589.60 was appropriated, \$3,802,196.60 for personal service, \$6,447,038.00 for maintenance and operation, \$212,000.00 for repairs, and \$969,355.00 for construction or permanent betterments. The total for the department \$11,620,732.60.

On March 31, 1918, the population of these institutions was 36,969, the capacity 28,997, the overcrowding 6,094 or 21 per cent.

These 39,000 patients were served by 162 medically trained men and women, namely 26 medical internes, 17 women physicians, 106 assistant physicians and 13 superintendents. This is one medical attendant, including superintendents and internes, to each 228 patients; or, excluding these, one to each 301 patients. There were 5,996 employees on March 31, 1918, or one to each 6.1 patients. Forty aliens or non-residents were deported or returned at an expense approximating \$3,500.00 each.

It is fair to presume that more than one half the patients in the thirteen State Hospitals of New York are suffering of dementia praecox and therefore nearly *six million dollars* has been appropriated for the custody of 18,000 dementia praecox patients for the current year.

The State Hospital Commission consists of one physician, Charles W. Pilgrim, and two laymen, Andrew D. Morgan and Fredrick A. Higgins. Everett S. Elwood is the secretary of the commission and J. L. Van De Mark, M. D., acting medical inspector.

George H. Kirby, M. D., is director of the Psychiatric Institute and Clarence O. Cheney, M. D., his assistant.

The superintendents of the thirteen State Hospitals are: Dr. Charles G. Wagner, Binghamton; Dr. Isham G. Harris, Brooklyn; Dr. G. A. Smith, Central Islip; Dr. Clarence A. Potter, Gowanda; Dr. Walter Ryan, Hudson River; Dr. William Austin Macy, Kings Park; Dr. Marcus B. Hayman, Manhattan; Dr. Maurice C. Ashley, Middletown; Dr. Eugene H. Howard, Rochester; Dr. Paul G. Taddiken, St. Lawrence; Dr. Harold Palmer, Utica; and Dr. Robert M. Elliott, Willard.

## BOOK REVIEW

Jelliffe & White: DISEASES OF THE NERVOUS SYSTEM. 1917, Philadelphia, Lee & Febiger. Large octavo, pp. 568.

This study of the diseases of the nervous system is a general text book designed for students and practitioners of medicine. Its two distinguished and lucid editors have written from the modern standpoint. Our readers are interested in the study of dementia praecox and the attitudes of modern writers toward this disease. The attitude of Drs. Jelliffe and White can be better shown by a few fragmentary quotations from Chapter Nineteen, than by an extended review of the book or the chapter.

(cc) *Dementia Praecox Group:* The term dementia praecox has been the occasion of a great deal of discussion. Coming into general use as it did as the result of the studies of the Kraepelinian school it was conceived to apply to a group of psychoses belonging to the period of adolescence and presenting dementia as a fundamental element in the symptom picture. When, however, it was seen that what appeared to be the same disease might occur later in life, even after thirty years of age, it seemed hardly proper to use the term praecox as applied to psychoses of early life. It was therefore proposed that the term praecox should refer not to the age of the patient, but to the relatively early appearance of dementia in the course of the disease. The term dementia was here used to mean permanent mental impairment, and when it was realized that many cases made good recoveries without any apparent or at least material defect remaining, another reason was evident for the inapplicability of the term. The concept, then, might be formulated that it was a disease in which dementia was a relatively early symptom, and that the recoveries occurred only when the disease had not progressed to any extent. This also, unfortunately, does not meet the facts, because many cases get well after prolonged and apparently chronic courses. In the absence of any well-defined criteria of dementia it was impossible to predict when it was or was not present, and therefore the term presents very many undesirable features. Although it is somewhat of a bootless task to discuss names, and although it is much more important to know what the names stand for than to quibble about their applicability, still it is of course desirable to have a name that fairly represents the thing named. . . .

"Dementia praecox must undoubtedly have always existed and have been observed by physicians, and in particular the grotesque cases of catatonic rigidity and peculiar mannerisms must have always attracted attention. In the early history of psychiatry, however, few descriptions of cases exist that could be unequivocally said to be cases of praecox, as the group had not been defined from other groups superficially resembling it, as for example, imbecility. Willis, the English anatomist, recognized as early as 1672 that many young people underwent deterioration and Sydenham, a hundred years later, in 1772, describes similar conditions under the

description of stupidity, while later on, after mania and melancholia had been more or less defined, many of the excitements and depressions that are incident to the course of dementia praecox were undoubtedly grouped under these headings, while at one period, only a few years ago, there was a distinct group supposedly representing a special disease described by the name of catalepsy, where also undoubtedly a certain number of praecox cases were arranged.

*"Etiology:* The question of *heredity* in praecox has been studied, particularly by Wolfsohn, who carefully analyzed the material from this standpoint at the Berghölzi asylum in Zurich. The study of 2,215 admissions disclosed 647 cases of dementia praecox of whom ninety per cent showed hereditary taint. Of four factors, mental disease was the most frequent—about sixty-four per cent—followed by nervous diseases, alcoholism, and other forms of hereditary taint. Heredity was combined in thirty-four per cent. The most frequent combinations were those of psychoses and alcoholism, and psychoses and nervous diseases. She concluded that a distinct influence of heredity could not be proved in the cases in which the taint was alcoholism, nervous disease, or other forms. The catatonic was the most and paranoid the least affected by the mental taint, while the influence of the taint had no striking effect on the character of the first symptoms of the disease. (p. 807.)

*"Physical:* A considerable number of praecox patients, particularly the catatonic and the hebephrenic, show marked physical symptoms, and not infrequently have all the outward appearances of being quite ill. They often emaciate during the early period of their illness, suffer from anorexia and insomnia, circulatory disturbances, disturbed cardiac action, cyanosis of the extremities, vasomotor disorders of which dermographia is not an infrequent manifestation. The deep reflexes are commonly exaggerated, while the pupils in this class of cases are characteristically dilated. *Convulsive* seizures of an epileptiform, but more frequently of an hysteriform, variety may occur. (p. 814.)

*"Treatment:* Dementia praecox has generally been considered to be a hopeless condition for which little or nothing could be done. This is at least not an attitude with which to approach a patient, and when we bear in mind the considerable number of recoveries that take place in the disease it is hardly an attitude that is warranted. The treatment, however, must of necessity be very difficult, because the conditions that have to be met are multitudinous and range all the way from disturbances of the lower physiological levels through distinctly psychological problems to the relation of the individual to his social milieu.

"At the present time a good deal of attention is being paid to the internal secretions. These may be investigated in the individual case, but as yet their beneficial action is unproved. (p. 833.)

"In the old cases of praecox that have become considerably dilapi-

dated, that are relatively quite inaccessible, it would seem that the best method of approach was through the agency of industrial training." (834.)

"Although a wholly pessimistic attitude is not warranted in approaching the problem of *præcox* in an individual case, still it must be realized that after all one can hardly expect a complete recovery." (p. 835.)

*"Prophylaxis:* The prophylaxis of dementia *præcox* is a most difficult problem, and in the first instance of course should be met from the eugenic standpoint. Marriage should be very carefully supervised where the individual comes from badly tainted stock. The possibilities of prophylaxis before the outbreak of the psychosis are not known, yet it would seem that it would be rational to endeavor to deal with those character anomalies that we know favor this type of disorder." (p. 836.)

E. Y. D.

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That we are dealing here with two distinct types of mental abnormality, which in the vast majority of cases are hereditary, constitutional and at present incurable, is beyond all doubt and is open to proof to anyone, adequately prepared by sufficient training and experience in clinic and institution, in medicine, psychiatry, neurology and psychology, who cares to undertake such research. These two classes readily fall into well-defined and well-recognized types of mental defectiveness; namely, the Feeble-Minded and the Dementia *Praecox* groups, except that in the classes under discussion the symptoms are not so clinically externally frank that it manifests itself in such a positive and grotesque manner that it is patent to all. Our feeble-minded institutions have been peopled until quite recently practically with idiots, imbeciles and a few low grade morons. High grade morons were present in relatively insignificant percentages. Among idiots, imbeciles and low grade morons mental arrest occurs early and they manifest their defect betimes, and it renders them so externally evident that the laity cannot help marking and grasping it. But with the high grade morons, while they are as potentially defective in their sphere of thinking and doing, it is not so outspoken as such, and to the comprehension of the laity is as little understood as the relationship between outspoken epileptic attacks and psychic equivalents.

The higher grade of psychopath and dementia *præcox* is to the low grades or outspoken insanities what the high grade feeble-minded, the moron, is to the lower grade feeble-minded, such as imbecile and idiot. The two high grade divisions have been the *x* and *y* of the criminological equation.

HICKSON.

## RESEARCH FOR PREVENTION AND CURE

A great change has come over medical affairs in England. In 1911 the Accident, Sick-benefit and Old-age Insurance was inaugurated by the most humane act ever passed by the British Parliament. It proposed an indemnity for the incapacitated members of the laboring classes to which capital, labor and the government contributed proportionately, and in the management of which each of these groups cooperated on equal footing. The Act was parallel with the German system inaugurated under Bismarck soon after the Franco-Prussian war, but it was far more outreaching and elevating and is worthy our serious study.

There is one line in the British Act to which medical men in America ought to give at this time special attention. After providing adequately for sick benefits, for indemnity for industrial accidents and for inevitable old age, it provided *that one penny on the pound* realized by this Act should be set aside for research into the causes of the diseases and accidents for which benefits and indemnities were necessary, and into the possible methods of prevention and cure. This line was written in by Lloyd George at the last moment before passage.

It seemed like a trifling thing, a penny on the pound, but it has realized almost half a million dollars a year before the Act has come into full force.\*

The war came on and although the benefit and indemnity features were well worked out, the research feature lagged in the hands of a most illustrious and dignified committee. The fourth annual report of this committee has just appeared and little progress in research can be reported. The ancient and honorable committee have, however, undertaken the publication of a record of all researches made in any part of the world on any of the conditions and diseases in which the committee is interested. The first issue of that journal has just appeared. The actual results of the research work done under the committee itself is negligible. Large bodies move slowly. The research funds are growing at a tremendous rate. The war shut off the supply of research men and the supply of research women in Great Britain is smaller than in the United States. Grants are made to well-established institutions, such as universities and schools, which are not or have not been utilized for lack of workers. There has been a large expenditure in safety devices and in studies of munition workers' diseases, which we hope will have temporary value and interest.

Perhaps the greatest benefit of the *penny on the pound fund* which can now be reckoned with is the great interest and activity which the growing fund has aroused in the British mind. The result has been the establishment of research fellowships in schools and hospitals as memorials for friends and scholars lost in the great war,—instance, for example, the

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\*Second report of National Health Insurance, 1914-1917. Cd. 8890.

Roland Poulton Palmer Scholarship at Guy's Hospital, \$750.00 a year for the study of "the origin of obscure diseases," and the first research fellowship in psychiatry in Great Britain just endowed at Edinburgh.

It has been frequently asserted, even *ex cathedra*, that conscious organized research has not been rewarded by any discovery of the first magnitude in the domain of medicine. It has been further maintained by the army of scientific pessimists and the Teutonic philosophers, that the research worker should pursue his experiments without any motive or interest except that for accuracy and truth. The perusal of the journals, bulletins and archives in which the work of our existing research organizations are published, convinces one of the widespread acceptance of that philosophy.<sup>†</sup> Most of the researches appear to have been undertaken without inspiring or even obvious motive: they seem to have been pursued without hope or pre-possession of any utilitarian discovery and they were completed and published without pragmatic or positive results. The very essence of these researches consists in their absolute inutility, their complete separation from a human desire to cure. The thesis, it seems, must not by any possible imputation be allied to the "pot boiler" of the artist group. The insinuation of a "motive for cure" damns the research man irretrievably and on the academic campus puts him with the "cure traders." "Art for art's sake" has been translated into "research for the sake of research." As art and music have renounced the service of religion and conviviality, so professional research refuses to serve suffering humanity and the art of medicine.

But, fortunately, however general this Brahminical and pedantic philosophy may have prevailed while we were under the Hunnish spell, there is reason to hope for a change as a result of the enlistment of many research men and of the promoters of research, in the solution of problems of humane importance, precipitated by the great war. It is an irrecovorable psychoclasm which befalls the soldier when he goes over the top, and the pedantic research man suffers a similar spiritual jolt when he has to face a military or national epidemic. From such an experience the trifling putterer in motiveless research can never return to his academic playthings and to a life more futile than the sacerdotal seclusion of a medieval monk.

The only way in which the full efficiency and power of scientific experimental research can be aroused and materialized, is by adequate humane motive. This motive must be essentially emotional and not merely intellectual. It is not enough for the research man to know his theorem, he must feel and feel deeply to the very roots of his nature. The problem before him must be his problem for victory or defeat, for life or death. The motive must be a possession and its solution in terms of human betterment, a mad pre-possession, a scientific frenzy.

<sup>†</sup>Cooper, Charles David: Report of the Findings of the Gregory Survey in Yelk County, Ohio. Educational Monthly, September, 1918.

The research itself with such a motive at heart, takes on vital interest. The research man is no longer fishing for anything he may catch in so many throws or casts of such and such a line and hook. He is not listlessly paralleling a previous technique, ready to accept a negative as complacently as a positive result. He is not in his laboratories as a disinterested and unprejudiced judge, but as a resourceful and determined advocate, importunate to wrest from nature's court a predetermined judgment and accounting. His research must be carried on with an indefatigable and unrelenting purpose and passion for a decision favorable to mankind.

The fate of institutions for research in the United States has been too often disappointing. Institutions established by private endowments have met the delays which the objects of private endowments so generally suffer in the hands of trustees to whom the testator may leave his funds, but in whom he cannot arouse his motive or his enthusiasm. There are numerous endowments for institutions of research on cancer, but none of them have made great or dominant contributions to our mastery of this dreadful disease. Trustees of general unspecified benevolent funds must expend them in conventional undertakings, but research is essentially an adventure into the unknown. It is not the survey of already discovered conditions.

Some boards of trustees still hold, multiplying in their hands, the funds of public benefactors dead a decade or more, with utter disregard of the object of the testator, outside of a perfunctory annual monetary accounting. In time, no doubt, the public will be taken into the confidence of all such quasi-public trusts and be represented on the board of trustees by an official and puissant public officer through whom the public interests may be insured, and the testator's designs may be accelerated.

Now and again an intelligent and public-spirited legislature passes a bill looking toward the relief of the State Treasury from the increasing load of the State Charities. Such a bill was passed by the Legislature of Illinois in 1907 as the "Code of Charities." By this law the Psychopathic Institute at Kankakee was founded. The institution was not adequately supported by subsequent legislatures, in spite of the fact that the appropriations for custody grew biennial period by biennial period until it passed the ten million mark. The director of the laboratory was burdened with all sorts of executive duties and has at last become the State Alienist as well. Research, never forceful nor continuous, has at last faded out at Kankakee. During the two or three biennial periods just passed, the have been so husbanded by the director that he has been able to turn back meager appropriations of less than twenty-five thousand dollars a year unexpended ten thousand dollars each period into the State Treasury. Still the expenditures for custody have gone on increasing. If they are ever to be materially diminished, it is to be done by finding the causes and methods of prevention and the cure of the insanities. The function of the Psychopathic Institute, as defined by the act, was to seek the cause, the pre-

vention and the cure of these diseases. The director of the Institute and the State Administration have not been interested in this matter. They have saved at the spigot of research while the spill at the bung-hole of custody has gone on increasing.

The Legislature of Illinois is now in session. The charities, under the Department of Public Welfare, will ask for an appropriation of twelve or fifteen million for the hopeless and therapeutically nihilistic custody of the insane and the epileptics. It would not be surprising if they asked for a few millions to institutionalize the feeble-minded, the morons and perhaps the inefficient disturbers of standardized industries.

The Department of Public Welfare, supported by the medical corps of the State hospitals, the alienists of the department and, in a large measure, by the professional alienists of the State in private practice, will come before the legislature and plead for more liberal appropriations for custody, for new institutions and for more liberal salaries. They will perhaps say: "Gentlemen, insanity is on the increase; our asylums are generally inadequate and crowded; many of them are fire-traps and should be replaced; we are not curing any of our patients and few of them recover spontaneously: we don't know the causes of any of the insanities except two of the rarer forms, one due to alcohol and the other to syphilis. These can, of course, be prevented, but it is not our business. The causes of the other insanities are absolutely unknown. Our wiseacres say the causes, if they exist, go back several generations and are not to be found out for several generations to come. Insanity is not a disease like chicken cholera, the loco among western cattle, the Texas fever or the yellows of our peach trees, but it is an hereditary curse and family taint. Give us plenty of funds and we will build institutions that will employ lots of returning soldiers, put lots of money in circulation and hasten a return to normal business conditions. We are prepared to take the epileptics in at Dixon, and since we have been shown the danger of the moron and the feeble-minded (the causes of all which conditions we know nothing about and care less) we are ready to take care of them in new institutions if the funds are only appropriated. About two and a half per cent of our population are likely to require this provision for segregation. It is useless to talk about curing our insane. That was tried out and abandoned long ago. We provide custody, and we have reduced its expense to less than fifty cents a day and public opinion will not stand for more reduction. The facts that smallpox, malaria, typhoid and yellow fever have been eliminated as plagues of mankind are not admissible or relative evidence in a plea for research into the causes and cure of the insanities. We have tried that tack long ago. It was tried at the Institute on Wards Island by Van Gieson, and at Kankakee during the last ten years. We won't mention the fact that the Germans abandoned research long ago in psychiatry as unprofitable and unbusiness-like. 'Organization, standardization and business efficiency' are our slogans.

Visit our institutions and you will find them slick and clean, with no bugs behind the mop boards."

But this is not our notion of political economy, or of the business administration of public affairs. It seems to us that the Department of Public Welfare can hardly afford to extend and diversify its charitable activities in the line of segregation, confinement and custody without an adequate effort to diminish the need of such unproductive expenditures by a corresponding, rational and determined effort to eliminate the need of them.

In the English bill referred to, the funds for research increase with the increase in the needs of indemnity and insurance. This seems the rational manner in which to establish a psychiatric research laboratory. The funds should be provided once for all by an appropriation as permanent as that for the salary of the Director of the Department of Public Welfare himself or any of its officers. It ought to be not less than one per cent of the total appropriation and it should be provided in the act that the funds provided thereby should be apportioned as accurately as may be to the study of those diseases or conditions for which the appropriations for custody are annually provided. Thus if there was an appropriation of \$9,000,000 for the custody of the insane, one per cent of that amount, or \$90,000, should be devoted to research into the causes, the cure and the prevention of the insanities. If \$2,000,000 were appropriated for the care and custody of the epileptics, then \$20,000 should be devoted to research into the cause, cure and prevention of that disease or condition. If a large appropriation is made for segregating penitentiary and penal institutions, and for dangerous and delinquent individuals, then a proportionate amount should be devoted to research into the cause of feeble-mindedness, moronism and delinquencies of conduct.

E. Y. DAVIS.

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"However, asylum work as a career is by no means growing in favor (in England) and is unlikely to do so until all the public asylums throughout the country have been linked up in such fashion that their officers can be regarded as members of one common service. At present, it is quite possible for a man who does excellent work to remain in the lower ranks all his life, and this fact, coupled with the desirability of minimizing as far as possible other existing drawbacks to asylum life, has led to the starting of a movement for reform."—B. M. J., Aug. 31, 1918, p. 241.

## A DISCUSSION OF THE DEMENTIA PROBLEM \*

By CHARLES T. LA MOURE

Superintendent State Training School and Hospital, Mansfield, Conn.

About ten years ago I became very much interested in this subject, but I have been sidetracked for the past five years with the feeble-minded. From my experience and work of ten years ago I am convinced that a certain number of these cases can be cured, but it is hard work and someone has to be with them practically all the time, and work right with them. I don't believe that you can do it with any great number as the individual case must be studied. If they are taken when they are young and followed up every day and hour I can not see why a number of them can not recover; and I will go further and say I do not see why we can not take the history of children going to school and diagnose a tendency to dementia praecox in the schools. If a record was taken when the child entered school of any heredity, anything of that kind, and if the child exhibited any peculiar symptoms in school, this should be noted by a physician, and then of course the life work should be laid out for the child by someone beside the parents. Instead of trying to make physicians, lawyers, etc., these cases should be studied carefully and they should be trained to some vocation less exacting. If we can not cure these dementia praecox cases we could make them so useful around the institutions they could be practically self-supporting. I think if they were started in on admission to the hospitals they could be taught much more than they are. For example, if the methods followed out in our schools for feeble-minded were used in hospitals for the insane the dementia praecox cases on admission would be started at some occupation and made to feel that they were of use. I would be glad to see some State take up this matter and make a thorough investigation and see what could be done. Of course, you know there is such an investigation being carried on in Chicago now. A fund known as the Sprague Foundation is back of it, with six million dollars to investigate the subject of mental diseases with especial regards to dementia praecox. But the physicians who have charge of that fund, I believe, are working on the theory that dementia praecox is due to physical ailment. I hardly think it is all physical. I am very sorry I could not carry on the work any longer, and I sincerely hope someone will follow it up.

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\*The State Hospital Quarterly, August, 1918, p. 396.

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It is passé for public officials to resent the queries and criticisms of plain citizens. The modern way is to turn attack into co-operation, to clear away doubt and uncertainties, and to carry out the will of the leaders of public opinion or fearlessly to show why not.—Philadelphia Bureau of Municipal Research.

## THE SIGNIFICANCE OF INTRASPINAL PRESSURE IN DEMENTIA PRÆCOX

(Continued from page 193)

There are many reasons to suspect increased intracranial and intraspinal pressure in dementia praecox. Southard has shown that at autopsy there is relative internal hydrocephalus, and that the left ventricle is more dilated than the right. With hydrocephalus there is usually increased intracranial pressure.

The pupils are generally dilated in dementia praecox, and intracranial pressure produces dilation of the pupil. Ophthalmologists report retinal findings with some congestion.—Blin.

In whooping cough and other chronic spasmodic coughs, and in long-continued retching and vomiting, the veins in the upper lids are dilated and such is the condition of the lids in many of our patients with dementia praecox.

All of these clinical symptoms are to be considered in relation to the tendency of our patients to edema and cyanosis and to inadequate aeration of the blood through hasty respiration, suggesting a possible cyanosis and edema of the brain.

In my own small number of cases of dementia praecox studied, twelve had intraspinal pressure above 160 mm. of water, one as high as 380 mm. Only three had intraspinal pressure below 160 mm. and one of these was a mute catatonic, greatly emaciated, and tube fed for several months.

J. Wilse Robinson\* has noticed marked benefit in catatonic patients after draining the spinal canal where high spinal pressure was observed in catatonic conditions. No benefit and no change has been shown by any of my patients. In one patient whose spinal pressure was 260 before appendicostomy and nightly irrigation of the colon with large quantities of water, the spinal pressure remained high three months after the patient had recovered and been continuously at work. (Sehraw.)

The intravenous injection of a 33 per cent solution of glucose brought down the intraspinal pressure, in one case as low as 40 mm., but two days later the pressure was back to its former mark. (Madaus.)

The spinal pressure in no dementia praecox patient that I have examined has fluctuated from day to day or week to week during the short periods under my observation. Even when great improvement followed, spinal pressure has not changed and approached normal.

On the assumption that changes in the brain cortex are responsible for the mental symptoms, it would be suspected that as these changes diminished the spinal pressure would approach the normal. More careful study of this subject is desirable.

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\*Robinson, G. Wilse, The value of lumbar puncture in stuporous catatonia. *Dem. Præ. Studies*, 1918, i, 101.

There does not seem to be any relation in our cases between blood pressure, mental symptoms or nutrition of the patient and the intraspinal pressure which they show.

In a few cases of long standing dementia praecox a good skiagraph has shown enlarged veins and venous sinuses.

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#### BIBLIOGRAPHY OF CEREBROSPINAL PRESSURE.

The literature and records relative to cerebrospinal pressure are scattered in the monographs and articles on physiology and medicine, and they are difficult to trace by the ordinary indices, such as the Index Medicus.

It is unfortunate that in Levison's recent history of Cerebrospinal Pressure in the *Journal of Syphilis*, no references are made to the literature from which his information is derived.

Since the bibliography is so enormous and scattered, and since the titles are so long and the references necessarily voluminous, I have thought it better to give here only eight of the principal articles, some of which furnish very extensive bibliographies of particular phases of the subject. The monograph of Anton and von Bramann gives the German literature; Sorrentino, the Italian and French literature, while the other authors give scattered and incomplete references to the French, English and American articles.

1. Sorrentino, Urbano.  
Semiciologia del liquido cefalo-rachidiano, Napoli, 1915, 80,  
p. 411, Bibl.
2. Anton G. and von Bramann.  
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3. Plant, Rehm and Schattmuller.  
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Jena, 1913, 80, 150, Bibl.
4. Dixon and Halliburton.  
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128-153, Bibl.
5. Cottin et Saloz.  
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35, 511-527, Bibl.
6. Landon, L. H.  
The absolute determination of intracranial pressure, J. Am.  
Med. Assn., 1917, 68, 1540-1542.
7. Skoog A. L.  
Cerebrospinal fluid pressure, J. Am. Med. Assn., 1917, 69,  
1064-1067.

SCOTTISH ASYLUMS' PATHOLOGICAL SCHEME—TWENTY-FIRST ANNUAL REPORT OF THE BOARD  
THE YEAR 1917

The work of this laboratory was carried on during the year, in spite of the war. In addition to the usual routine work, Dr. W. Ford Robertson has continued his important series of investigations into the bacteriology of premature dementia (*dementia praecox*) and the insanities generally and the diagnosis and treatment of the infections present in these conditions, by means of the administration of appropriate vaccines and sera. From Dr. Robertson's modest report it is obvious that favorable results have been obtained in a number of cases and especially in returned soldiers, sailors, doctots and nurses.

The laboratory which was established twenty-one years ago is now doing valuable war work in spite of the fact that nearly all the assistants of Dr. Robertson have gone into active service abroad. The total expenditures of this laboratory of little more than \$5,000.00 seems trifling compared with the possibilities of research and the expenditure of nearly \$2,000.00 in War Saving Certificates by the board, a short-sighted, if not cruel, act.

Reports were made during the year on forty-one asylum cases. Thirty-eight of these entailed a bacteriologic study. Eleven of these were dementia praecox, so that Dr. Robertson has added considerably to the report already made. Therapeutic immunization has been carried out in each case with encouraging results in many instances. One case under observation five months has so far improved that all signs of active progress of the disease have subsided.

During the year Dr. Robertson has contributed an article on the Pathology of Insanity to Green's Encyclopedia and Dictionary of Medicine and Surgery, 1918.

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Adler, Herman M. Cook County, and the Mentally Handicapped, etc.  
Publication No. 13, National Committee for Mental Hygiene, Inc., 50  
Union Square, New York City, 8, xi and 224. Price 25c.

This belated publication of a survey, finished before the author took service at \$4,000.00 a year under the County Board in the spring of 1917, when Dr. Healy left vacant the directorship of the Juvenile Psychopathic Institute, appeared in September, 1918. It can be obtained from the publisher for twenty-five cents and is worth the money. Special attention should be called to pp. 101-106. It will be interesting to all who are acquainted with the relation between juvenile delinquency and dementia praecox. In these few pages the spirit of this so-called survey is obvious. Although names are paraded elsewhere in the "survey" without abbrevia-

tion, the name of the director of the Municipal Psychopathic Laboratory is not mentioned. Perhaps the name of Dr. W. J. Hickson is too well known in this connection to require spelling out. The similar treatment of the eighty-five schools for defective and handicapped children under Dr. D. P. Macmillan and the Board of Education would be termed by a trades union committee nothing short of unfair.

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Tenth and Eleventh Annual Reports of the Municipal Court of Chicago.  
For the years December 6, 1915, to December 2, 1917, inclusive. Published by the Court, 8 p. 386.

This public document is interesting to our readers because it contains the report of the Director of the Psychopathic Laboratory of the Municipal Court of Chicago, p. 124-386. Indeed it is a compendium on the legal-aspects of dementia praecox and congenital deterioration which emanates from the largest medico-legal clinic in the world. This clinic has been in operation since 1914 and is an epoch-making effort to treat the juvenile offenders on a rational basis. This report is more than a report; it is a thesis. It is the greatest work on the subject that has ever been published. It may be possible for this magazine to republish a few important pages of this report at some future time, but at present our crowded pages can only urge every library of psychiatry and sociology to secure a copy of this book for the use of serious students. The custody of the 140,000 committed dementia praecox patients in the United States probably costs the country less than the delinquencies of a much smaller number of uncommitted cases that show themselves nowhere except in police records, courts and prisons. This work is a record of service rather than of research, but is not surpassed in value and interest, especially to the students of dementia praecox, by any existing monograph on the subject.

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Arranging the dementia praecox cases with reference to thalamic gliosis, age at death and duration of the psychosis, it is found that the four cases showing no gliosis were all under forty years, and that the psychosis was of short duration (not over one year). Of the four cases having a gliosis more marked and more active in the thalamus than elsewhere, three fall in the fifth decade, the third early in the sixth, and their psychoses were of three to five years' duration. Of two cases presenting a gliosis of roughly comparable degree, both in the thalamus and in other parts of the nervous system, one was in the second half of the sixth decade, and the disease was of long standing (nineteen years); the second was in the middle of the fifth decade, and the disease was of six years' duration. The group presenting a gliosis either almost limited to the thalamus or more advanced there is, therefore, intermediate in duration, and, with the exception of one case, intermediate also in age.

MORSE.

## HISTORIES OF RECOVERED PATIENTS \*

(Continued)

Edward Burke was admitted to the Laboratory Ward on March 17, 1917, and was examined by Dr. Walter Ford, who wrote his history and took notes until June 1, 1917. Burke knew the day of the month and the day of the week and answered questions accurately but sometimes tardily. He said he lived at 5026 Union avenue, Chicago; that he came to the Psychopathic Hospital on February 26 last; that he was born in 1899 and was 17 years old, and that this was the County Hospital—all correct. He said he was not nervous or afraid, but that he was sad because he abused himself and therefore was brought to the hospital. He believes that people jeer at him on the street and elsewhere, on this account.

On March 20th, when the examination was continued, he said the men where he worked accused him of self-abuse because he forgot what he went after when he was sent on an errand. He does not think anyone "had it in for him" for anything else. He denied that he heard voices and accusations, and no evidence could be elicited of hallucinations or delusions.

Memory for past events and for numbers was fair. He made characteristic mistakes, such as returning 378 when 387 had been given a few minutes before. He said that Wilson was president of the United States, Marshall, Secretary of State, but does not know who is Governor of Illinois or Mayor of Chicago. He knows Germany is at war but does not know what country she is fighting with. He cannot name any other European country. His schooling seems to have been deficient and he has not been interested in current events, especially not lately.

His mother (49 years old?), who is a very bright and witty Irish woman, gives the following information: Edward Burke's father is sixty years old and works interruptedly (alcoholism?). Edward has a brother and sister (Mrs. Mae Golden) both older. There is no history of insanity, epilepsy, tuberculosis or chronic alcoholism in the family on either father's or mother's side.

Edward was born in Chicago in 1899. He was an exceptionally good child and never got into trouble. He went to school when seven years old and liked it. He left at fourteen and went to work. He was then in the fifth grade (retardation). For two years he drove delivery wagon at the same job and then at age of sixteen became assistant to a boiler maker. He kept this job until this sickness began to show itself. He complained of feeling sick and stayed at home because he was "so tired." His mother thinks the work was too heavy for so young a boy and that it broke down

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\*From the Research Laboratory of the Psychopathic Hospital, Cook County Hospital, Chicago, Bayard Holmes, M. D., Director; Julius Retinger, Ph. D., Biochemist; Harry M. Jones, Ph. D., Bacteriologist; Walter Ford, M. D., Psychiatrist; H. C. Stevens, Ph. D., M. D., Psychologist; James Henderson, Blood Morphologist; Paul Headland, Clinical Assistant; Leola Sexton, Gertrude Ohlmacher and others, entertainment, occupation and re-education.

his health. He has been seclusive, hoarding his money, undemonstrative and quiet all his life, but until recently he went out with boys of his own age as much as his brother does.

Before being brought to the hospital (Feb. 26th) he became furiously angry with his sister, who accused him of being lazy. In an outburst of temper he struck the chandelier and broke the globes, a piece of glass cutting his forehead. The mother thinks the boy all right mentally, but run down and emaciated physically, though she says he has improved during his stay in the hospital.

The patient himself says he is crazy and hopelessly insane and should be in Dunning (Dunning or Chicago State Hospital). He "just as leave stay here." He appears depressed and melancholy though he has not an expressive face. He sits in the ward in one place for long periods of time, picking his face. He admits that he has sinned and is only getting what he deserves by being locked up in an insane ward. He thinks he will always have to stay locked up and seems resigned to stay here if we will keep him. He has no desire or ambition to go to work again, although he admits that he ought to. His movements are slow and somewhat in keeping with his mental attitude. He does not hear people talking about him now, here in the hospital or outside in the street. He thinks the men here treat him all right, but he does not know whether they are his friends or not. The only thing the men where he worked said against him was that he abused himself and this he admits he did.

On April 30th Dr. Ford notes that Edward still lies around and is careless of his dress and person. He is, however, apparently more cheerful and smiles when approached and in conversation. When questioned he seems still depressed and feels that he is "crazy and hopelessly insane." When asked why he thinks so, he says he knows it, and when asked how he knows it, he says because his head feels funny and that he has a pain on the left side of his head. He has had it, he says, continuously, and all the time since a month before he came here. He came here, he says, because he tried to cut that side of his head to relieve the pain. He wants to go to Dunning (State Hospital) for life. He would rather go there than stay here. He has never visited Dunning but has heard about it. He does not answer questions readily and he is hard to talk with.

In May Dr. Ford notes that there is little change in his patient or in his behavior. He is careless in his attire and habits. He seems to take little notice of others and to be occupied with his own thoughts. His expression of countenance is not one of depression. He answers questions slowly or not at all. Today he denied that he wished to go to Dunning (State Hospital). As for staying, he did not object to remaining here for a while. When asked if he wished to stay here the rest of his life, he did not answer.

The nurse on the case, Mr. Anderson, is afraid Burke will attempt

sueicide and that he requires constant watching, but he does not give any reason for his opinion except to say the patient has attempted to harm himself and was brought here for that reason.

On May 17th Burke was taken from the ward to the adjoining examining room, which is connected by unlocked doors with the laboratory rooms, by Dr. Stevens for his mental tests. When this examination was over, Dr. Stevens neglected to take the patient at once to the locked ward. Burke appears to have slipped into the Blood Morphology Laboratory and drunk some of the bottles of staining fluid. His lips and face bore stains of aniline in several colors, and the bottles were emptied. He was taken to the ward and his stomach washed out. This washing did not reveal any large amount of staining material and it is possible he emptied the several bottles in the watercloset and stained his face and lips to quiz the faculty.

During the past few days Burke has been changing, his attendants declare, and has become more active and mischievous. He is more playful and cheerful. He sat down on the floor and whirled himself around like a top until he tore or wore his trousers out at the seat. When asked by Dr. Ford if he still wished to go to Dunning, he laughed at the idea and at the suggestion that he had ever said he was crazy and lost forever. He thinks now that he was crazy but that he is getting well.

May 24th. This morning Dr. Ford found Edward Burke unusually cheerful. He smiled when spoken to but did not have anything to say until questioned. He answered questions more promptly than before. He says he took a drink of stain in the laboratory because he was looking for poison to end his life. When asked how the stains tasted he said, "Oh, all right; they tasted good." When asked why he did not drink them all, he said it was no use to drink them, they tasted too good to kill him, and it would be useless to drink them. He says he does not want to die. He does not care to go to Dunning. He is willing to stay here the rest of his life, although he might sometime want to go out to work. He says he has helped here to mop the floors.

His general mental attitude is peculiar and changeable. He sits and stares ahead of him and pays little or no attention to what is going on around him in the ward or examining room, and is slow to respond to what is said to him. He answers questions tardily, slowly and briefly and seems to hold saliva in his mouth. He sits with his hand on his forehead and appears, as he says, that he is tired and stupid. Marked retardation is noticed in all his actions. Although he says he is sad, he does not remain so all the time, but for a moment can be made to forget his trouble. His attention is frequently attracted by outside noises, and at times he appears absent-minded and thoughtful. Dr. Ford concludes that this is a case of dementia praecox on a relative feeble-minded basis, without frequent violent episodes or continuous delusions.

Dr. H. M. Stevens carried out the mental tests on April 27th. Yerkes-

Bridges Point scale gave 57 total credits; mental age 9; coefficient I. A. 57/88.3. The Rosalimo curve is to be found on page 18 of the January number of these Studies.

The physical examinations were made interruptedly by each member of the faculty. The gymnastics and re-educational employment occupied one or two hours a day and were conducted by the faculty and by the efficient and devoted young women under Mrs. Schlagel of the local Mental Hygiene Society. As soon as the ward was in order shower baths were given every patient every morning before dressing, and at four o'clock every afternoon. There were only ten beds in the wards and the gymnastics were given there, while the weaving, drawing, painting and other light employments were carried on in an adjoining room, but behind the ward door, so that the boys could go freely from the employment room to the ward and day room.

Dr. Ford notes the following conditions: The patient is a slender, medium sized boy of 17 years. His skin is white, his hair dark brown and his eyes brown. He is fairly well developed, but not strong. His skin is pale and he looks tired. His teeth and mouth negative. His pulse and temperature normal and blood pressure 120. Heart and blood vessels negative. His chest expansion is only 1½ in. He does not breathe deeply; there is no area of dullness in the chest and no tenderness in the abdomen. There is tympany over the entire area of the colon. His deep reflexes are normal. Pupils react to light and accommodation. No Romberg. Head is large and well shaped; there is a scar on his forehead.

The first examination the writer made of Burke disclosed the retreating lower jaw, narrow roof of the mouth and poor nasal development. There were several bad teeth that we had treated at the dental school. The tonsils were cleaned out but not extirpated at the clinic.

The chest was round and the shoulders narrow. The upper eyelids had enlarged veins and the pupils were moderately dilated. While the pupils reacted to light they did not react to touch on the sclera. The sexual organs seemed to be normal, though the testicles were small, at least as compared with the penis. There was no show of venereal disease. The semen was not examined. The seminal vesicles could not be reached with the finger. There were no hemorrhoids. The hair on body rather scanty and on the face very patchy and light. There was no excessive sebum on scalp and face. The nails, especially on the halluces, showed coincident transverse grooves. The apophyses of the tibiae to which the patellar ligaments are attached are very prominent, perhaps because of his kneeling so much in boiler making.

On April 29th blood was removed for the defensive ferment reaction of Abderhalden. Dr. Julius Retinger used thirty substrates which he had prepared himself in dialysis which he had made. The method followed was strictly that of Abderhalden. Five substrates gave positive results.

namely, three in the cerebral cortex, vision sensory, motor and frontal association; and two elsewhere, namely, pons and testicle. Parietal association, motor, speech, sensory and auditory were negative from the cerebral cortex and corpus callosum, pineal body, the three parts of the pituitary, the infundibulum, dura, cerebellum, optic thalamus, basic nucleus, dentate nucleus, medulla and spinal cord were also negative. Thyroid, parathyroid, adrenal, pancreas, liver, spleen and all controls were negative and clear. This result is typical of dementia præcox. Wassermann reactions had been made March 9th on the blood by Dr. Retinger with sphyilitic liver and all negative.

The blood pressure was frequently taken by Dr. Ford and was always low, varying between 95 and 130, generally 110 in the ward and 120 in the examining room. The temperature was normal except when there was some slight tonsilitis or toothache, for both of which he was treated.

The adrenalin reaction on April 30th was not paradoxical. When one-half a cube centimeter of P. D. & Co.'s 1-1000 adrenalin solution was injected into the deltoid, the blood pressure rose for five minutes from 130, pulse 96, to 140, pulse 98. Fifteen minutes after the injection the blood pressure was 132 and the pulse 96. This continued for half an hour, during which time Dr. Ford observed the patient.

The ocular or pupillary paradox was pronounced, the pupil expanded when the conjunctival sac had been instilled with adrenalin for ten minutes. The morphology of the blood was uniform and characteristic. The red corpuscles were excessive, 5,480,000 to 5,600,000, normal in appearance, and generally 49 or more per cent of the bulk. The white corpuscles, 9,000 to 12,000. The small mono-nuclears, 22 to 33; the large, 3 to 6; the poly-nuclears, 70 to 62; the eosinophiles, 1 to 2, and the Arneth nuclear scale on two counts in April, I, 4 and 6; II, 40 to 25; III, 42 and 52; IV, 12 and 14, and V, 2 and 3.

The urine was frequently examined and beyond the excess of indian, little of interest observed. It was acid, clear with sp. gr. 1,014 to 1,017, and no abnormal chemical or morphologic elements.

On May 15th a specimen of stool was examined by Dr. Horry M. Jones. The dialysate obtained by eighteen hours in the ice box showed a PH value of 6.2. The dilution of 1-200,000 proved to be too dilute when placed on plain agar and was the first instance in which it was observed that a relatively slight acidity of the stool is associated with a greatly diminished bacterial count. Stools of neutral reaction show counts averaging 5,000,000,000 per gram of sample, while stools showing a PH of as low as 6.0 show 100,000 to 200,000, that is a difference of 5,000 to 1.

On May 24th another sample was examined. The reaction was about 6.1 and the total count 150,000 per gram of stool; *B. coli* being the only variety appearing on the plates. Another sample was inoculated on June 5th into histidin medium, but the resulting growths were discarded because

sufficient histidin could not be obtained at that time for testing the histamine forming property of the isolated varieties.

It does not appear that Burke ever drank or caroused. He smokes, but hardly to any excess, but about as Stockyards boys do, making their own cigarettes. He generally carried his lunch and ate his other meals at home. His mother does not impress one as a very careful housekeeper and may not have provided very good meals, but her other two children are healthy and strong.

During June his father was sick and died early in July, and Edward was taken home for the funeral. He was brought back on July 23rd by the police.

During the latter part of April, Burke was given the barium meal on an empty stomach and examined before the fleuroscope by Dr. E. S. Blaine at the Cook County Hospital laboratory. The esophagus, cardia, stomach and pylorus acted normally and no error could be detected in the duodenum. The stomach was empty at the six-hour seance and no remnant of the meal could be found in the small intestine anywhere. The cecum was full. At the twenty-four hour seance the cecum was still full, but a large part of this meal was in the sigmoid and rectum. At the fifty-four hour seance the cecum was nearly empty but the appendix was still full. There was no evidence found of a spasm of the sphincter of Cannon.

Dr. Paul Headland examined Edward Burke after his return to the ward July 23rd and gave the intravenous treatment. He was a very cheerful patient but careless and shiftless. In dressing after the morning shower he threw his clothes on and put stockings on with the heels over the top of the foot, as likely as any way. He showed childish eagerness and enthusiasm for what he wanted. He was wild to smoke, and when examined, papers and the makings were found on him and he proceeded to roll a cigarette at once. He said he had given a nickel to someone from the outside to bring them in. He was perfectly oriented and has understanding of his condition. He does not care to go to Dunning. He laughs about his condition, however, and taps his head, saying, "Nobody home." His memory is good. He knows who is president and mayor, but does not know we are at war. He says Germany is at war with France. He denies any delusions but laughs to himself and sits staring at nothing. He remembers drinking the stains in the laboratory but declares laughingly that he did not wish to kill himself.

All the blood and urine examinations were repeated several times by Dr. Headland and Dr. Wood. The reds still continue numerous, 5,070,000 at the least, and the whites relatively low, 8,000 to 10,000. The hemoglobin index was high, 90 plus. The small mononuclears, 6-17; the large, 14-30; the polynuclears, 66-60; the eosinophiles, 1-2, and the Arneth nuclear count was at the same time I, 9-6; II, 28-24; III, 51-36; IV, 9-29, and V, 3-5.

On July 31st, at 10:00 a. m. his spinal pressure was 288 mm. of water

taken reclining on the left side. He was then given intravenously 150 cc. of freshly sterilized thirty-three per cent solution of glucose. At 4:00 p. m. his intraspinal pressure was 221 mm. water. The Arneth counts were made before the injection and again the morning after the injection. The five classes were as follows:

July 31st, 10:00 a. m., I, 2; II, 43; III, 30; IV, 14; V, 2.

Aug. 1st, 10:00 a. m., I, 30; II, 46; III, 22; V, 2; V, 0.

The urine was examined every hour except during the latter part of the night. It contained no glucose, except during the first two hours after the injection. The patient was on ward diet and was undisturbed by the injection and showed no disturbance of temperature.

When Burke was brought to the operating room for the spinal puncture, he was a little disturbed and would not calm down and get in place for the puncture. He cried a little and said it was unnecessary. Immediately after the puncture he was averse to taking the glucose injection in his vein. He said he couldn't see why he should get it while the other boys did not. He was told that the other patients had been given injections but it did not console him. When told that it was a medicine to make him well, he said there was no hope for him; that he was crazy in his head, and that there was no hope for him. He said this in a light vein, although he apparently recognizes that he is mentally unbalanced. He is always cheerful but foolish and irresponsible.

When the second spinal puncture was made at 4:00 p. m. to see if the intraspinal pressure had been brought down by the intravenous injection of glucose, he scolded constantly about it, but when put on the table never moved while the puncture was made.

During August several intravenous injections of normal salt solutions were given. The water was freshly re-distilled the day of the injection, and after the salt was added it was re-sterilized in the flask from which the injection was given. The pure gum tube and the needle were sterilized at the same time. There was never any thermal reaction from any of the injections. The first injection of 750 cc. isotonic salt solution was given at 2:00 p. m. August 9th, and the second August 16th. The temperature was normal and the pulse 102 before the injection and 94 after the injection. Burke was very much disturbed before this injection and still maintains that he is singled out for this treatment. All the morning before the injection he was childish, foolish and hard to manage. After the injection he was much improved, quiet and rational. The routine of the ward was not disturbed and Burke went to meals and to the bath the same as the other boys.

August 23rd. The patient was given 650 cc. NaCl solution at 3:00 p. m. Patient still disturbed and hints at suicide and "shooting up his family." He has been much better the past week; pulse 84 before the injection, 88 after; no disturbance of temperature.

August 29th, at 2:30 p. m., patient was given 750 cc. NaCl solution. Patient very willing and quiet.

September 11th, patient given 500 c.c. NaCl solution, at 2:00 p. m. no reaction.

The result of the normal salt injections had not been very satisfactory. The blood pressure was still low; the ocular and blood pressure paradoxes continued. The cecal stasis, though not excessive, was more than fifty-four hours. The mental condition and the conduct of the patient was little, if at all, improved. After explaining my desire to perform appendicostomy and wash out the cecum and colon every night, the mother and sister gave their consent in writing, and the patient was transferred to the County Hospital and appendicostomy was performed by one of the surgeons. The result was typical and the patient was returned to the laboratory ward in two weeks.

Irrigations of the cecum and colon through the appendix every evening with six quarts of yeast containing warm water, was begun a few days later, the patient sitting during the irrigation upon the stool. The cecum received about 650 cc. of the solution when the intracecal pressure rose, as shown by the attached manometer, to five feet, and then suddenly fell to one or two feet as the cecum emptied through the valve of Cannon into the transverse colon, and in a few seconds into the bowl of the water-closet. The cecum filled again and again as the manometer showed, at a much lower pressure each time, as if the resistance at the ring of Cannon gave way. These injections were continued for six weeks and the improvement of the patient was indubitable, and at the request of his family he was allowed to leave the ward. He conducted his own irrigations very faithfully at home and continued to improve and went to work at the boiler-works at Thanksgiving time.

On December 5, 1917, he was presented with six other recovered or greatly improved dementia praecox boys treated in this laboratory before the regular meeting of the Chicago Medical Society in the Marshall Field building. All these boys had come to the meeting from their several homes, unattended, and all but two of them were working at the time for wages.

Burke was last seen by me on September 14, 1918, one year after appendicostomy. The appendix was still open and stood out above the skin like a little umbilicus. It did not leak fecal matter. Burke was at regular work at the time, and although it was easy to see that he was not a perfectly normal boy, he was well enough to do his work and take care of himself and his mother.

Dr. Hepburn took care of Burke with influenza-pneumonia at St. Bernard's Hospital the last of September, and reports his complete recovery.

## IS INSANITY DISEASE OR NOT?

The following two quotations showing one type of attitude toward the problem and how hard such ideas die might well be contrasted with the next three, illustrating another attitude. The Lord Chancellor of England in the House of Lords, March 11, 1862, declared that "the introduction of medical opinions and medieval theories into the subject has proceeded upon the vicious principle of considering insanity as a disease."<sup>1</sup>

In 1862 the Supreme Court of North Carolina in pronouncing judgment said: "To know the right and still the wrong pursue, proceeds from a perverse will brought about by the seductions of the Evil One."

The necessity, however, for considering, on the other hand, the problem of delinquency as one for psychopathology has been recognized theoretically at least for years, as the following quotations from well-known authorities will attest.

"Legislation instead of being founded on prejudice and instinct should rest on the conclusions of mental pathology." (Jeremy Bentham, Theory of Legislation.)

"The science of justice and the science of nature are one. Justice should be based on medico-psychology." Michelet.<sup>2</sup>

"Laws ought to be correlations derived from the nature of the subject." Montesquieu.<sup>3</sup>

The final acceptance, however, of these latter theories has waited on concrete demonstration, and it is this lack and completing bond that we have attempted to supply for the first time in the present and previous reports and papers issued by the laboratory, in which systematic research, with exact tests along psychopathological and correlated neurological and medical lines, was made on sufficiently large and representative groups of delinquents, as well as their crimes, coming into the various courts, to be conclusive.

That others besides psychopathologists perceive the necessity for the medico-psychological examination of delinquents, the following quotation, translated from "Das Handbuch fuer Untersuchungsrichter," written by Hans Gross, Professor of Law at the University of Graz, singularly attests, coming, as it does, from an international authority of the highest standing in criminology as well as jurisprudence. He says:

"One of the most important questions the examining judge is in duty bound to weigh and consider is, which among the defendants and important witnesses<sup>4</sup> coming before him should receive psychiatric attention.—

HICKSON.

<sup>1</sup> Much of the criticism the Municipal Psychopathic Laboratory underwent in the beginning will no doubt sound just as absurd a few years hence.

<sup>2</sup> "La science de la justice et la science de la nature sont unes. Il faut que la justice devienne une médecine s'éclairant des sciences psychologiques." Michelet.

<sup>3</sup> "Les lois sont les rapports nécessaires qui dérivent de la nature des choses." Montesquieu, *L'Esprit des Lois*.

# INDEX OF VOL. I, 1918

## Subjects and Names

Abderhalden, Reaction in Brain Disease.....	21
Adler, Herman M., Cook County Survey.....	258
Adrenalin Mydriasis in Dementia Praecox.....	30
Apology for a Journal on Dementia Praecox.....	4
Appendicostomy in Catatonic Dementia Praecox.....	27
Appropriations in New York, 1918.....	246
Attitude in Dementia Praecox.....	188
Austregeselo, Hook Worm and Dementia Praecox.....	75
Bibliography, Recent of Dementia Praecox.....	194
Billings, Frank, President Sprague Institute.....	194
Blaine, Edward S., Roentgenologist.....	49, 105, 126, 203, 260
Bondurant, Eugene D.....	73
Chambers, Ralph H., Adrenalin Mydriasis.....	30
Cooper, Charles David, Yelp County Survey .....	251
"Does It Pay to Cure?".....	71
Diet as Cause of Mental Disease .....	153
Dementia Praecox, the Victim .....	35
Ecker, Enrico .....	128, 137
Employment and Re-education .....	238
Endocrine Organs in Dementia Praecox.....	92
Ernst, J. R., Appendicostomy .....	27
Ford, Walter, Laboratory Reports.....	49, 105, 131, 203, 260
Forster, Laura, Ovaries in Mental Disease.....	79
Freiberger, W. B., Finance Committee City Club.....	125
Fuller, Geo. E., Patron of Laboratory .....	121
Fuller, Solomon C., Adrenalin Mydriasis .....	30
George, Lloyd, His "Penny on the Pound for Research".....	250
Guthrie, L. V., Fifteen Cases with Isotonic Salt Solution.....	61
Hart, Walter .....	128
Hassin, G. B., Histopathology Dementia Praecox.....	7
Headland, Paul .....	49, 105, 203, 260

Henderson, James .....	49, 105, 203, 260
Histopathology of Dementia Praecox .....	7
Holmes, Bayard, Apology for "Studies".....	4
Employment and Re-education .....	I..... 238
Victim of Dementia Praecox .....	35
Laboratory Report .....	49, 105, 111, 203, 260
Intraspinal Pressure .....	190
Macroglossia ... .....	244
Huntington State Hospital .....	61
Hutchings, Richard H., State and Insane.....	181
Insurance and Indemnity, British Act .....	250
Intraspinal Pressure .....	190
Ishida, N., Ten Cases Isotonic Salt Solution .....	67
Jones, Horry M., Laboratory Reports.....	49, 105, 203, 260
Kern, Fred J., President Board of Administration.....	124
Kirby, George H., Psychiatric Institute, N. Y.....	246
Kojima, M., Endocrine Organs .....	92
Lafora, G. R., Sodium Nucleate in Dementia Praecox.....	69
La Moure, Charles T., Problem of Dementia Praecox .....	255
La Moure, Charles T., Statistics, N. Y., 1916.....	14
Leininger, Geo., Superintendent Chicago State Hospital.....	122-124
Leonard, Edward Franklin, Experiment in Re-education .....	240
Lumbar Puncture in Dementia Praecox .....	101
Macroglossia in Dementia Praecox .....	244
Mead, Leonard, Yankton Experiment .....	239
Mercier, Charles .....	153
Mott, F. W., Discussion .....	86
New York State Hospital, Statistics, 1916 .....	14
Nolan, William J., Occupation and Dementia Praecox.....	213
Norman, Herbert J., War and Dementia Praecox .....	99
Nuzum, John, Pathologist County Hospital .....	126
Occupation and Dementia Praecox .....	213
Ohlmacher, Gertrude .....	49, 105, 203, 260
Olson, Judge Harry, Municipal Court Report.....	259

- Orr, David, Organization of Research ..... 172  
Ovaries in Mental Diseases ..... 79  
"Penny on the Pound for Research" ..... 250  
Pilgrim, Charles W., N. Y. Commission ..... 246  
Point of View of This Journal ..... 1  
Pollock, Horatio M., Social Problem in N. Y. .... 149  
Problem of Dementia Praecox ..... 255, 258  
Psychopathic Research Laboratory of Cook County Hospital, Chicago, 1917-1918 118  
Psychopathic Laboratory Cook County, Recovered Patients..... 49, 105, 203, 260  
Reinberg, Peter, President Cook County Board..... 123  
Research for Prevention and Cure..... 250  
Research, Organization of ..... 172  
Reviews—Revised Psychiatry, by Noboru Ishida ..... 111  
    Cook County and the Mentally Handicapped..... 258  
    Diseases of the Nervous System, Jelliffe & White..... 247  
    Municipal Court of Chicago, Tenth and Eleventh Annual Reports... 259  
Retinger, Julius, Abderhalden of Brain ..... 21  
    Laboratory Reports ..... 49, 105, 138, 203, 260  
Robertson, W. Ford, Pathologic Scheme ..... 258  
Robinson, G. Wilse, Lumbar Puncture..... 101  
Rossolimo Test in Dementia Praecox..... 16  
Sands, A. B., Superintendent of Nurses ..... 128  
Salt Solution in Fifteen Cases ..... 61, 67  
Sasano, K. ..... 67, 111  
Scheme of Scottish Asylums ..... 258  
Scholarship Guy's, Roland P. Palmer ..... 251  
Sexton, Leola ..... 49, 105, 203, 260  
Social Problem in New York..... 149  
Sodium Nucleate in Dementia Praecox ..... 69  
Solle, Will H., Bibliography ..... 194  
South Dakota, Yankton Experiment ..... 238  
State and the Insane, N. Y..... 181  
Steen, R. H., Egyptian Attitude ..... 188  
Stevens, Herman Campbell, Point of View ..... 1

Stevens, Herman Campbell, Rossolimo Test .....	16
Larboratory Reports.....	49, 105, 203, 260
Szwajkart, Adam, Superintendent Psychopathic Hospital.....	121
Uncinariasis and Dementia Præcox .....	73
War Hospitals and Dementia Præcox .....	99
Wells, H. Gideon, Sprague Institute .....	122
Wood, Amelia .....	49, 105, 128, 203, 260
Zeller, Geo., Alienist of Illinois .....	122

# Dementia Praecox Studies

A Journal of Psychiatry of Adolescence

January

1918

"OUR POINT OF VIEW"—H. C. STEVENS.....	1
"THE APOLOGY TO THE READER"—BAYARD HOLMES.	4
"THE PRESENT STATUS OF HISTOPATHOLOGY OF DEMENTIA PRAECOX"—G. B. HASSIN.....	7
"A STUDY OF THE STATISTICS OF DEMENTIA PRAECOX FROM THE REPORT OF THE NEW YORK STATE HOSPITALS FOR THE NINE MONTHS ENDING JUNE 30, 1916"—CHAS. T. LAMOURE..	14
"THE ROSSOLIMO TESTS IN DEMENTIA PRAECOX"—HERMAN CAMPBELL STEVENS.....	16
"THE ABDERHALDEN REACTION IN THE DIAGNOSIS OF LOCAL CHANGES IN THE BRAIN AND OTHER ORGANS"—JULIUS RETINGER.....	21
"CATATONIC DEMENTIA PRAECOX"—REPORT OF A CASE—J. R. ERNST.....	27
"ADRENALIN MYDRIASIS"—SOLOMON C. FULLER AND RALPH M. CHAMBERS.....	30
"THE VICTIM OF DEMENTIA PRAECOX" — BAYARD HOLMES .....	35
"NOTES FROM HISTORIES OF RECOVERED PATIENTS" —LABORATORY REPORTS .....	49

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GENERALITER AUTEM PRO SUSPECTO HABENDUM UNICUIQUE RERUM NATURAM CONTEMPLANTI QUICQUID INTELLECTUM SUUM POTISSIMUM CAPIT ET DETINET: TANTOQUE MAJOR ADHIBENDA IN HUJUSMODI PLACITIS EST CAUTIO, UT INTELLECTUS SERVETUR AEQUUS ET PURUS.

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# Dementia Praecox Studies

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April

1918

"NOTES OF FIVE CASES OF DEMENTIA PRAECOX TREATED BY ISOTONIC SALT SOLUTION AT HUNTINGTON (W. VA.) STATE HOSPITAL DUR- ING 1917"—L. V. GUTHRIE.....	61
"ABSTRACT OF TEN CASES TREATED BY ISHIDA"— K. SASANO .....	67
"ABSTRACT OF LAFORA'S USE OF SODIUM NU- CLEATE"—ED. .....	69
"DOES IT PAY TO CURE?"—ED.....	71
"DEMENTIA PRAECOX ASSOCIATED WITH UNCINA- RIASIS"—EUGENE D. BONDURANT.....	73
"EDITORIAL COMMENT ON SAME".....	75
"HISTOLOGICAL EXAMINATION OF THE OVARIES IN MENTAL DISEASES"—LAURA FORSTER.....	79
"ADDENDUM"—F. W. MOTT.....	86
"STUDIES OF ENDOCRINE ORGANS OF DEMENTIA PRAECOX"—M. KOJIMA.....	92
"DEMENTIA PRAECOX IN A WAR HOSPITAL"—HER- BERT J. NORMAN.....	99
"THE VALUE OF LUMBAR PUNCTURE IN STUPOROUS CATATONIA"—G. WILSE ROBINSON.....	101
"NOTES FROM THE HISTORY OF RECOVERED PA- TIENTS"—(CONTINUED) .....	105
"REVIEW OF ISHIDA'S NEWLY REVISED PSYCHIATRY" —K. SASANO .....	111
"REPORT OF THE PSYCHOPATHIC RESEARCH LABORA- TORY, COOK COUNTY HOSPITAL, CHICAGO"— BAYARD HOLMES .....	118

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1918

"DEMENTIA PRAECOX AS A SOCIAL PROBLEM IN NEW YORK STATE"—HORATIO M. POLLOCK.....	149
"DIET AS A FACTOR IN THE CAUSATION OF MENTAL DISEASE"—CHARLES MERCIER .....	153
"SOME INTRODUCTORY REMARKS ON THE ORGANIZATION OF RESEARCH"—DAVID ORR.....	172
"THE STATE AND THE INSANE"—RICHARD H. HUTCHINGS .....	181
"A CHARACTERISTIC ATTITUDE ASSUMED BY MANY CASES OF DEMENTIA PRAECOX"—R. H. STEEN.	188
"THE SIGNIFICANCE OF INTRASPINAL PRESSURE IN DEMENTIA PRAECOX"—BAYARD HOLMES.....	190
"RECENT DEMENTIA PRAECOX BIBLIOGRAPHY"—WILL H. ROGERS.....	194
"HISTORIES OF RECOVERED PATIENTS"—(CONTINUED)—RESEARCH LABORATORY OF THE PSYCHOPATHIC HOSPITAL, COOK COUNTY HOSPITAL, CHICAGO .....	203

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- "OCCUPATION AND DEMENTIA PRAECOX"—WILLIAM J. NOLAN ..... 213
- "EMPLOYMENT AND RE-EDUCATION OF DEMENTIA PRAECOX PATIENTS"—BAYARD HOLMES ..... 238
- "MACROGLOSSIA AND SIMIAN PROTRUSION AND SEPARATION OF THE TEETH IN THE COURSE OF DEMENTIA PRAECOX"—BAYARD HOLMES ..... 244
- "DISEASES OF THE NERVOUS SYSTEM"—JELLIFFE AND WHITE ..... 247
- "RESEARCH FOR PREVENTION AND CURE"—E. Y. DAVIS ..... 250
- "DISCUSSION OF THE DEMENTIA PRAECOX PROBLEM"—CHARLES T. LAMOUR ..... 255
- "THE SIGNIFICANCE OF INTRASPINAL PRESSURE IN DEMENTIA PRAECOX"—(CONTINUED)—BAYARD HOLMES ..... 256
- "SCOTTISH ASYLUMS' PATHOLOGICAL SCHEME. TWENTY-FIRST ANNUAL REPORT" ..... 258
- "COOK COUNTY AND THE MENTALLY HANDICAPPED, ETC."—HERMAN M. ADLER ..... 258
- "ANNUAL REPORT OF MUNICIPAL COURT OF CHICAGO, 1915-1917"—JUDGE HARRY OLSON AND W. J. HICKSON ..... 259
- "HISTORIES OF RECOVERED PATIENTS"—(CONTINUED)—RESEARCH LABORATORY, PSYCHOPATHIC HOSPITAL, COOK COUNTY HOSPITAL, CHICAGO. 260
- "IS INSANITY DISEASE OR NOT?"—W. J. HICKSON. 268

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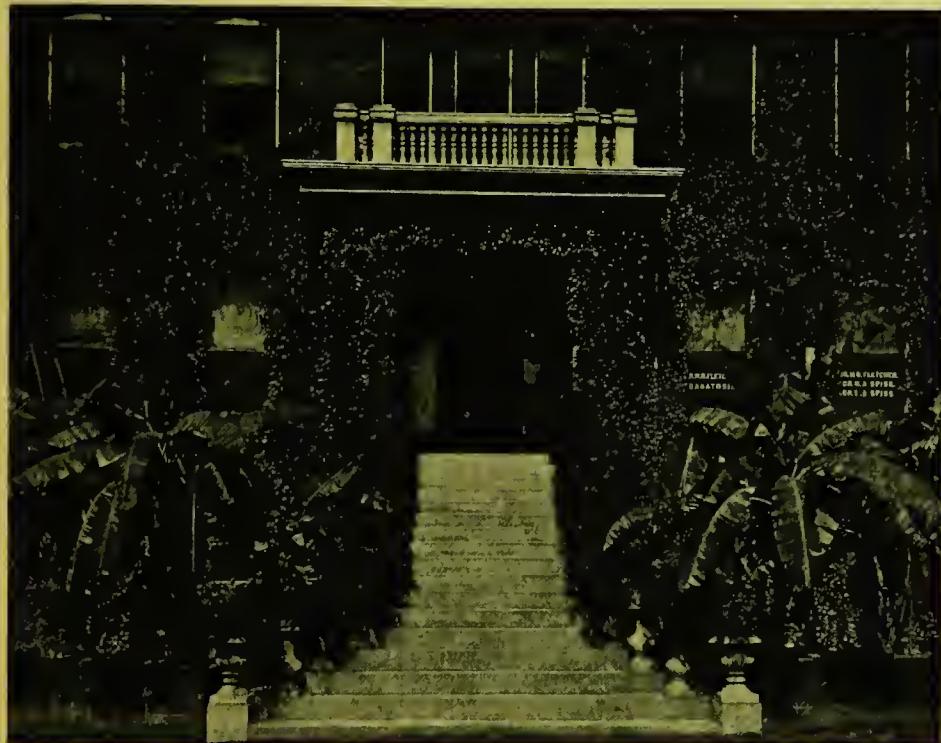
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